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Searching under stress: Anxiety and selective information exposure

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SEARCHING UNDER STRESS: ANXIETY AND SELECTIVE INFORMATION EXPOSURE

BY

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DEDICATION

This dissertation is dedicated to my parents, Robert and Kathryn Surawski, who read to me every night, drove me to dance lessons, gave me a voice in my own education, met with my teachers, let me make a mess in the kitchen, attended every field hockey game, bought me books, listened when I talked, took interest in my research, supported my decision to study psychology even though they thought English was a better idea, continually encouraged me in graduate school, and provided an enormous amount of financial support throughout my education. This project would not have been attempted without the work you began 27 years ago. This project would not have been completed without the work that you continue to do.

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ABSTRACT

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For centuries, political philosophers have argued that emotion clouds rational judgment and should be avoided at all costs. In light of advances made in the fields of social cognition, political science, and social psychology, however, the question of how affective states work in conjunction with cognitive processes has been approached anew, and interesting patterns have emerged in the data. They theory of affective intelligence (Marcus, Neuman, & MacKuen, 2000) posits that emotional arousal, particularly anxiety, alerts organisms to gather and evaluate information from the environment that can be useful for self-protection. On the other hand, terror management theory (Solomon, Greenberg, & Pyszczynski, 2002) predicts that anxious individuals will protect themselves from information that is death-related or that threatens their worldview. The primary purpose of this study was to determine if preference for information exposure changes following a threat. Anxiety was manipulated through faux online news articles about nuclear terrorism. After reading the articles, participants spent time exploring a website that contained links to further information about terrorism, some of which reassured the participants of their safety, some of which further threatened their sense of well-being. The order in which the links were clicked and the amount of time spent on each webpage was recorded for each participant. Additionally, participants completed

the Need for Evaluation Scale (Jarvis & Petty, 1996), the Miller Behavioral Style Scale (Miller, 1987), and the Brief Big Five Personality Inventory (Gosling, Renfrow, & Swann, 2003) in order to assess individual differences. Although anxiety increased for participants reading an unsafe message about nuclear power, no differences were found between the experimental groups in their preference for information. Overall, participants strongly preferred threatening information, spending roughly three times as long on the threatening websites than on reassuring websites. While high scores on the Need for Evaluation scale predicted less time spent on the threatening websites, the other individual difference measures failed to predict level of information exposure. Overall, the results of this study indicate that following a threat, the preference for information that further heightens anxiety is stronger than the preference for information that would assuage fear.

CHAPTER 1

INTRODUCTION

American citizens experienced tremendous emotional upheaval from a series of events that began with the terrorist attacks on the World Trade Center and the Pentagon in the fall of 2001 and came to include the mailing of anthrax to members of Congress, thirteen sniper attacks on innocent bystanders in the Washington, D.C. area, and a war in Afghanistan. Shortly after, the debate over the invasion of Iraq, which centered around the security threat posed by Saddam Hussein, came to dominate media airwaves. By the time the 2004 presidential campaign season had begun, political scientists, pundits, psychologists, and the lay public alike wondered how the new focus on homeland security would impact voters' decisions. In fact, this question contributed to the attempt by pollsters to predict the vote outcomes of a newly identified set of swing voters – "security moms" – whose concern with national security not only closed the gender gap in attitudes toward military spending, but even took precedence over their concern with civil liberties (Tumulty, Novak, Barnes, Baron, Bower, Carney, Healy, Sieger, & Underwood, 2003). Just as the question of how these women would behave after their political habits were abandoned in favor of rational information processing that enabled them to choose the candidate who could keep their families safe, the question of how voters would react in the face of another terrorist attack occurring immediately before the elections was also raised. Some speculated that a second attack preceding the election

would highlight incumbent George W. Bush's incompetence and failure to protect the nation, while others argued that such an attack would again result in the same wave of nationalism and support for the President that occurred after the 2001 attacks. In short, a consensus that fear and anxiety would somehow influence the behavior of voters seemed to exist, but an understanding of exactly how these emotions would influence their thoughts and behavior remained elusive.

Of course, the intersection of emotion and reason in the domain of politics has been a question of concern before the socio-political events occurring at the inception of the second millennium. Anaxagoras, some time around 450 B.C.E., posited that emotions hinder the search for truth, and that the mind can and should prevent passion from affecting thought and behavior. This ideal served as the basis for the doctrine of stoicism which came to dominate the history of Western political thought (Marcus, Neuman, & MacKuen, 2000). Political theorists, particularly enlightenment thinkers such as Locke and Rousseau, have celebrated the human capacity to weigh the positive and negative consequences of a variety of possible actions in a logical manner, and argued for the formation of social institutions that allow citizens the freedom to use this capacity. These thinkers – and the founders of modern democracies that they, in turn, influenced - believed that civic engagement should involve a careful and deliberate search for unbiased information about political issues, a period of reflection during which the information is evaluated, and then finally a decision about which course of action (i.e., voting for a particular candidate) would best meet the goals of the individual. Even today, the idea of human beings as efficient and rational information processors is prevalent in political science and economics. However, this view of cognition is only a

prescription and, given the research findings in cognitive psychology and related disciplines, not likely to be accurate.

In the late 1940s and 1950s, Herbert Simon challenged the idea that people attempt to maximize their self-interest by logically evaluating all available information and making decisions accordingly (e.g., Simon, 1955). To appreciate his point, consider for a second the amount of information that is available in the environment during a typical election campaign. Not only are there multiple candidates concurrently vying for seats in multiple elections, there are multiple issues on which the candidates can vary. It would be beyond the capacity of working memory to consider every piece of information to which an individual was exposed, let alone to evaluate this information against the individual's goals along with the consideration of the probability that certain consequences would result from the action taken. A person trying to decide between John Kerry and George W. Bush in 2004, for example, would have to know where each candidate stood on a number of issues, determine which candidate's positions are most aligned with his or her own positions, all while weighing the likelihood that significant change on the issue could occur over the time span in which the chosen candidate was in office. Of course, pen and paper could be used in order to help summarize the information, but that would require a degree of motivation that probably does not characterize most voters. Instead, Simon contended that the process of human judgment can best be described as "satisficing" – the attempt to identify an outcome that may satisfy but will at least suffice to meet some objective.

In 1964, Philip Converse, pulling on Simon's theory of bounded rationality, wrote an influential chapter in which he identified further restrictions on voter's ability to make

carefully reasoned decisions about which candidates to support. Psychological constraints such as the framing of political messages in terms of superordinate values (for example, "social justice") could enable voters to bind together a multitude of attitudes and beliefs that may not entirely be consistent with each other. Additionally, social constraints such as the simplified way in which political information is presented to the public will also affect how political information is encoded and evaluated in the minds of voters.

Merely a few years after the publication of Converse's chapter, Kahneman and Tversky (1982) began their ground-breaking work on the identification of the biases and heuristics prevalent in human cognition that constrain rationality. Experimental studies demonstrated that people prefer risky political candidates when potential policy outcomes are described as gains, while risk-averse candidates are more popular when these same policy outcomes are presented in terms of losses. Similarly, support for the Equal Rights Amendment was stronger among experimental participants who read a description that framed the amendment in terms of eliminating discrimination (a loss frame), than among participants who read a description that framed the issue in terms of improving women's rights (a gain frame). Furthermore, when experimental participants were presented with a description of a policy currently in place and a proposed amendment to that policy, they overwhelmingly chose to keep the status quo – regardless of which policy was described as current and which policy was described as the amendment (Quattrone & Tversky, 1988). Clearly, these and similar findings present a challenge to the prescriptive models of rational political thought.

Another challenge to the classical ideal of the rational political actor is the influence of emotion. Throughout the history of Western thought, passion has been viewed as an agent that serves only to corrupt logic – a force that distracts and misleads the mind away from rationality. This view of emotion, though, like the view that civic engagement should be based on reason is also merely an ideology, and fails to describe the processes that actually underlie political cognition. To assume that people do not allow their emotions to affect their thinking simply because philosophers have condemned it is to misunderstand the nature of human cognition. In 1971, Carroll Izard wrote:

> "In general, emotions [have been viewed] as transient and troublesome states serving no really important purpose. The rational man ideology has succeeded in hiding from man his full nature...the human being is neurophysiological, motoric, emotional, and cognitive. To drop out any of these components would be to make the organism less than human, not more than human, as the rational man ideology puts it" (p. 396).

In order to advance the understanding of political cognition, then, its nature as both boundedly rational and emotional must be recognized. However, the traditional conception of the interplay of emotion and reason must be re-examined. Instead of hindering rationality, emotion can be viewed as an aid to it. If learning information about multiple candidates, issues, and elections is a substantial cognitive burden, then citizens may decide to gather this information only when they are sufficiently motivated to do so. What drives this motivation is emotional investment with the issues. In other words, feeling strongly about an issue may not preclude the ability to think rationally, it instead may motivate an individual to search for and evaluate information. Passion may not be the enemy of reason.

Interestingly, two theories have been advanced in the psychology and political science literatures regarding the role of emotion as a motivating factor in the search for and evaluation of further information about an issue. Central to both theories is the motivating power of anxiety. While one theory – the theory of affective intelligence, (Marcus, Neuman, & MacKuen, 2000) - posits that anxiety is the friend of reason and motivates citizens to learn and engage, the other, terror management theory (Pyszczynski, Solomon, & Greenberg, 2003) is more aligned with the classical position that strong emotions cloud judgment. This latter theory is intuitively appealing on account of the many examples that can easily be brought to mind of people being "carried away" by their emotions. Think, for instance, of radical pro-life activists who so fervently believe that fetuses have a right to life that they are willing to kill clinic staffers – an action that does not logically follow from the belief that life should be protected. Furthermore, the conjecture that anxiety debilitates rational thought is consistent with the backlash movement toward "moral values" that occurred after the string of anxiety-provoking events that began with the attack on the World Trade Center in New York. Some political theorists have attributed the movement toward the right to an increased psychological need to affirm that the world operates in predictable ways that can be understood and controlled.

The present study, then, is an attempt to reconcile these two competing theories about the role of affect – specifically, anxiety - on the motivation to seek out and evaluate information about a political issue. Although both the theory of affective intelligence and the terror management theory have received considerable attention in the fields of political science and psychology respectively, to date, they have not been empirically

compared. In the following pages, both theories will be described in detail and their relevant literatures will be reviewed. Next, methodological issues common to both bodies of literature will be discussed, and ways in which these issues can be addressed will be proposed. Finally, the possibility that quantifiable individual differences exist on the ability of anxiety to motivate behavior will be addressed, along with the implications that these differences, if found, would have on the predictive validity of each theory. A comprehensive understanding cannot be achieved, however, without first reviewing the emotion literature that was used to formulate the current theories of emotion and political behavior.

Emotion

For the first time in 1998, the *Handbook of Social Psychology* included a chapter on emotion. In the opening paragraphs, Robert Zajonc bemoans two aspects of the history of emotion research; first, emotion researchers are more likely to approach the topic from within the context of their own sub-discipline: developmentalists are interested in understanding emotional development and regulation; social psychologists might be interested in the influence of affect on social behavior, such as in mobs or crowds; while cognitive psychologists might study the impact of emotion on memory. Since emotion researchers are coming at the problem of understanding emotion from very specific backgrounds and seek to answer very specific questions, the nature of the literature on emotions is patchy, somewhat disorganized, and fails to offer a comprehensive theory. Second, Zajonc bemoans the relative paucity of work that has been done on emotion. These two points prompt Zajonc to argue that the entire contents

of his chapter and each of the references contained within it are needed to achieve only the most basic understanding of the function, structure, and effects of emotion.

Nevertheless, such a definition is not practical, and so I will adopt Caroll Izard's definition of emotion: "An emotion is experienced as a feeling that motivates, organizes, and guides perceptions, thoughts, and actions" (Izard, 1991, p. 14). The motivating power of emotion directs action toward some goal; in rage, for example, the goal might be to remove the source of frustration, while in disgust the goal might be to retreat from a potentially toxic stimulus. Feeling a particular emotion will also color experience. To a sad individual, there is no end to morose events, while a happy individual may perceive delight in almost anything she encounters. The theory of how emotions evolved will help to illuminate these functional components of emotion.

Emotion is believed by many to have evolved from approach-avoidance reactions shared by even the simplest forms of life (Izard, 1991). The abilities to discern danger from sustenance and to repel from or approach them are important for survival, well-being, and reproduction. Emotions gradually evolved with phylogenetic complexity, which requires longer periods of time for an organism to reach maturity. Infants' ability to communicate their internal state to their caretakers by crying, for example, increases the chances that their physiological needs will be met, while smiling and cooing cements the emotional bond between infant and caretaker, further ensuring that the infant will receive attention and care. Some argue, then, that infants' dependence on others contributed to the development of discrete emotions. This evolutionary theory of emotion has been supported by the finding that people of seemingly all cultures can recognize and identify the emotions associated with particular facial expressions

(Darwin, 1899; Izard, 1971; Ekman & Friesen, 1978), suggesting a common biological heritage.

While most researchers would contend that emotions have evolved to help organisms meet their physiological needs, there is not much consensus on the way emotions are structured or their specific functions. For the sake of brevity, the only approaches to understanding the structure of emotion to be discussed here will be those that receive the most attention and support in the literature, the dimensional approach and the differential approach (for a review of psychoanalytic theories of emotion, see Shapiro & Emde, 1993; for a review of self-theories see Dweck, 1991; for a review of the cognitive theories literature see Lazarus, 1995).

The dimensional theories of emotion have in common the position that emotions can be located on one or more continua. Spencer (1890, as cited in Izard, 1979), the first to argue this point, claimed that all emotions fell along a single pleasantness-unpleasantness dimension. Later, Wundt (1896, as cited in Izard, 1979) included Spencer's demarcation in his own three-factor dimensional theory which also included the dimensions of relaxation-tension and calm-excitement. Duffy's (1962) theory includes a dimension of arousal, similar to Wundt's dimension of calm-excitement, and a positive-negative dimension. More recently, Russell (1980), Larsen and Diener (1992) and Reisenzein (1994) have found evidence suggesting that emotions fall along two dimensions, one of pleasure-displeasure and one of energy that ranges from sleep to frenetic arousal. Watson and Tellegren (1985) also proposed independent positive and negative dimensions along with an activation dimension.

Despite the differences, some researchers are beginning to argue that a great deal of overlap exists in the dimensions across theories (Feldman Barrett & Russell, 1999; Yik, Russell, & Barrett, 1999), and that the dimensions are simply labeled differently. In fact, James Russell (2003) has recently argued that many of the differences that exist among dimensional theories can be traced back to semantics – that the words that we use to describe emotion are not differentiated enough to cover the entire range of affective experiences. To illustrate this point, he describes the very different types of fear in the same individual, Alice. First she encounters a bear in the woods, is frightened, and flees to safety. In another example, Alice is sitting in a theatre watching the movie *Alien.* She is frightened, but she is fully absorbed in the movie and does not run from it. In another iteration, Alice is afraid that she will miss her flight and so she speeds toward the airport. These situations all seem to represent different phenomenological experiences of approach and avoidance, yet they can all be described by the word "fear."

Critics of this approach, then, argue that the use of common language constrains the scientific understanding of emotion. As an alternative, many researchers who do not work within the context of the dimensional theories are likely to support a discrete or basic approach to emotion. These theories are characterized by the belief that each emotion is its own unique physiological and phenomenological state.

Ekman (1999) has outlined the characteristics that define basic emotions. First, basic emotions must have distinctive universal signals. Basic emotions can be nonverbally communicated and understood in all cultures, which does seem to be the case. Second, specific physiological arousal patterns must exist for each of the basic emotions, although Ekman concedes that the evidence is still converging on this point.

Third, a sub-conscious appraisal system must exist that arouses the particular emotion in response to a stimulus, again a point that needs to be further researched but is supported by several theorists' adoption of this point in their own explanations of basic emotions. Fourth, there must be some common elements to the situations that arouse the basic emotions, a logical conjecture that has found support in studies, for example, that have found that the loss of loved ones causes sadness across cultures.

Ekman's own list of basic emotions includes anger, disgust, fear, joy, sadness, and surprise. Izard (1971) includes anger, disgust, contempt, distress, fear, guilt, interest, joy, shame, and surprise. Frijda (1986) argues that desire, happiness, interest, surprise, wonder, and sorrow comprise the basic emotions, while Plutchik's (1962) list contains acceptance, anger, anticipation, disgust, joy, fear, sadness, and surprise. Generally, these researchers believe that the basic emotions combine in various ways to produce the vast range of human emotional experience.

It appears that the discrete theorists work largely separately from the dimensional theorists in the attempt to understand the structure of emotion. Little overlap can be found in the literature. Feldman Barrett and Russell (1999), who work within the dimensional approach, suggested that emotions might be experiences comprised of many distinct processes that originate in different parts of the brain, and the experience of feeling a particular emotion is the result of the integration of these processes. This view likely represents the starting point for both the dimensional and discrete theories of emotion, and so perhaps abiding by Russell's suggestion to inhibit the use of common language in emotion research will establish a common ground in the literature.

Another problem related to structure of emotion is the issue of state and trait emotion. Some emotional experiences are fleeting, while others last for significantly longer periods of time (Cattell & Scheier, 1961). Although state and trait emotion are not thought to differ in their phenomenological experience, state emotion is thought to have a greater range of intensity than trait emotion. Izard (1991) argued that trait emotion may be due to low neurological thresholds for particular emotions. Although the present study is primarily interested in state emotion, it will be necessary to measure and control for participants' levels of trait emotion.

Emotions have a variety of physiological and psychological effects. Physiologically, emotion activates the autonomic nervous system which releases hormones and other messengers which, in turn, have a variety of further influences, including the speeding up or slowing down of breathing and the heart, among other things. These changes help the body respond quickly to threat (Frijda, 1988). There is also substantial evidence that emotional state can influence the functioning of the immune system. Prolonged periods of stress or negative emotion are associated with decreased immune functioning (Ader & Cohen, 1985).

Emotion can have effects at the perceptual level as well. In a now classic study, Izard, Naglar, Randally, & Fox (1965) staged either a pleasant or unpleasant encounter with an experimenter before showing participants faces exhibiting positive or negative expressions in a stereoscope (a device that allows a separate image to be viewed by each eye). Participants who were experiencing negative emotion from the unpleasant encounter reported seeing more faces with negative expressions, while the opposite pattern was true for participants who experienced a pleasant encounter.

Questions about the effect of emotion on cognition have generated much research. Cognitive psychologists have found evidence that individuals encode new information into an associative network that contains information about his or her current affective state; better recall, therefore, is expected for information when the individual is in a similar mood to the time when the information was initially encoded (Bower, 1981). Isen (1987) found that positive emotional states are more conducive for thinking creatively.

The literature on the impact of emotion on cognition is large, and more of it will be reviewed with specific reference to anxiety within the specific discussions of the theory of affective intelligence and terror management theory. To summarize this brief overview of the emotion literature: there is much disagreement over the structure of emotion, but most theorists agree that it has evolved to help organisms prepare to fight, flight, mate, or care for offspring, all activities that enhance survival of the species. Emotion has been found to have pervasive physiological and cognitive effects, and much more research is needed in order to fully understand these effects, particularly research that incorporates methodology beyond simple reaction time measures in order to facilitate understanding of how anxiety influences more complex cognitive tasks, such as choosing news media. Although more work on emotion is needed, affective intelligence and terror management theorists have both drawn on the emotion literature to support their ideas; in the following pages their theories will be presented, along with relevant studies that support or disconfirm their hypotheses.

The Theory of Affective Intelligence

In 1993, political scientists George Marcus and Michael MacKuen published a paper in *American Political Science Review* in which they presented support for the hypothesis that two different emotions – anxiety and enthusiasm – had very different influences on perception and behavior.

Drawing from an evolutionary perspective in which anxiety is considered to be adaptive on account of its ability to motivate organisms to attend to their environment, thus enabling them to detect danger, Marcus and MacKuen were attempting to test the hypothesis that feeling anxious about political events and candidates will motivate citizens to search for further information about them. Using data from the 1980 American National Election Studies (ANES), these authors were able to produce four significant findings:

First, they demonstrated that anxiety and enthusiasm for learning political information and engaging in politics are separate and distinct emotional responses to candidates. The 1980 ANES asked respondents if each of the presidential candidates had ever made them felt "angry", "hopeful", "afraid of him", "proud", "disgusted", "sympathetic toward him", and "uneasy." Although anxiety was not one of the adjectives included by the ANES staff, Marcus and MacKuen reasoned that the terms *afraid, uneasy*, *anger*, and *disgust* would approximate the affective state they were trying to capture. Factor analysis with varimax rotation of a principal factor solution did reveal two factors that were consistent with their hypotheses: one factor was correlated with the terms hopeful, proud, and sympathetic toward the candidate, and a second factor

correlated with the terms anger, afraid, disgust, and unease. If these two factors were merely opposite endpoints of the same approach-avoidance continuum, then they would not be expected to relate orthogonally to each other. In fact, however, they do. Marcus and MacKuen interpreted this finding as disconfirming evidence for a simple valence view of emotion.

In order to test further hypotheses that anxiety and enthusiasm have different effects on behavior, the question of how closely the emotions of private citizens are related to socio-political events had to be addressed first. After all, if there was no relation between reported affect and concurrent political events, any attempt to measure the effect of emotion on the learning of political information would be superfluous. This question of whether or not citizens experience emotional reactions that change along with the political landscape comprised the second study of Marcus and MacKuen's 1993 paper. The authors tracked the rate at which each of the emotional terms (the same terms used in the first study) were volunteered by respondents participating in three different waves of the ANES, and found significant changes in levels of perceived enthusiasm and anxiety about each candidate corresponded closely with a number of events relative to the campaign. For example, in January 1980, 40% of the ANES respondents volunteered terms such as *uneasy* or *disgusted* to describe their emotional reactions to Carter. Following an inflation scare, rising unemployment levels, and the hostage crisis, however, the number of respondents reporting they felt uneasy or disgusted increased to 53%.

Experimental evidence supports the existence of emotional reactions to political events as well. Marcus, Wood, and Theiss-Morse, (1998) presented subjects with

information about political groups that they had previously described as being offensive. The participants were then presented with different messages about the types of activities that the group engaged in: one message portrayed the actions as orderly and responsible, while the other message described the actions of the group as violent and unruly. After the participants were exposed to the message, they were asked to complete a mood scale. Additionally, some of the participants provided physiological measurements of their arousal. As predicted, the participants who were exposed to the violent and unruly message reported (and demonstrated physiologically) higher levels of anxiety and arousal than participants who had been exposed to the benign message.

Once anxiety and enthusiasm were demonstrated to be distinct emotional systems and that citizens do, indeed, experience them in reaction to political events, the hypothesis that anxiety and enthusiasm have different motivational effects on political behavior could be tested. In Marcus and MacKuen's third study, vote choice was regressed on anxiety and enthusiasm scores. In all three waves of the 1980 ANES, enthusiasm for the candidate predicted vote choice, but anxiety did not have an effect. These two emotions, then, do not appear to function the same way as enthusiasm in political cognition.

In their fourth study, Marcus and MacKuen tested the hypothesis that feeling anxious is associated with decreased identification with a political party. According to evolutionary theory, anxiety is triggered by a perceived threat in the environment and disrupts ongoing activity so that the organism can re-allocate resources to self-protection. Feeling anxious about politics, Marcus and MacKuen argued, should motivate the voter to decrease his or her reliance on party identification as an automatic method for

assessing political beliefs, and increase the search for objective information. A regression model built to test this hypothesis, did, in fact, reveal this pattern in the data: anxious voters are less likely to rely on habit. Furthermore, respondents who reported feeling anxious about the candidates were also more likely to correctly place Reagan to the right of Carter on three policy issues, a finding that demonstrates the motivation to seek out and learn new information.

To summarize their findings, then, Marcus and MacKuen demonstrated the distinct effect of two different emotions – enthusiasm and anxiety – on how people approach politics. Feeling enthusiastic about a candidate motivates people to vote and participate in politics, while feeling anxious motivates people to spend more time and energy learning about political events. The major contribution of these studies, then, is twofold: first, they provided some of the first empirical evidence that emotion does affect how individual citizens react to political information – regardless of the rational man ideology sustained by political philosophers for centuries. Second, they implied that the classical view of emotion as detrimental to rational thought is incorrect; instead, heightened anxiety seems to prod the voter into more deliberate consideration of the information available to him or her in the environment.

Marcus and MacKuen's paper has received considerable attention in the field of political psychology. It has been included in a number of collections of classic readings, such as the *Oxford Handbook of Political Psychology* edited by Sears, Huddy, and Jervis (2003), recent compilation edited by Jost and Sidanius (2004), among other appearances in edited books and annual reviews. The paper, not surprisingly, has also been central to the careers of the authors, who have expanded their original 1993 findings about the

function of emotion in political behavior into a comprehensive theory, the theory of affective intelligence.

Affective intelligence may seem like an odd name for a theory that attempts to describe the impact of emotional reactions on specifically political behavior – particularly given the separate and distinct research on emotional intelligence which has been of interest to personality psychologists. What George Marcus, Michael MacKuen, and their colleague Russell Neuman hoped to express with that title is the idea that emotion and reason are not mutually exclusive; that affect can enhance intelligent thinking (Marcus, Neuman, & MacKuen, 2000).

The theory, essentially, is as follows: two different neurological sub-systems exist within the limbic systems that regulate conscious awareness. The first system, labeled the disposition system, has two functions. First, it is the seat of procedural memory for automatic, habitual behaviors. Second, it monitors the ability of the body to meet the demands that are being placed on it. It notices, for example, the level of energy that is available to be consumed and the relative difficulty of the task at hand. When the disposition system has determined that the organism can effectively perform the task, emotions of satisfaction and enthusiasm are aroused in the individual. However, when the disposition has detected that there is a mismatch between the amount of resources needed and the amount of resources available to complete the task, feelings of depression and frustration are aroused. These feelings are adaptive because they prevent the organism from engaging in behavior that may ultimately be harmful to it. Take, for example, a runner who is training for the marathon. It is unlikely that she will be able to run the full 26 miles on the exact day that she decides to take up running, and if she were

to force her body to do so, she would likely end up injured. Marcus, Neuman, and MacKuen (2000) argue that the disposition system enables the runner to experience frustration and despair that signals she should not attempt to run 26 miles, and she would stop before her body is harmed. The disposition system, then, underlies the experience and motivation associated with the emotion of enthusiasm, which in turn enables the organism to know when to engage in a task and when to quit.

The dispositional system is relevant to the study of political behavior because it describes the conditions under which citizens will participate in politics. When they are feeling particularly enthusiastic about a candidate because that candidate seems especially able to deliver desired outcomes, citizens will be more likely to go to the polls or wave a sign on a street corner. They feel enthusiastic about politics because they have sensed that their goals can be met by a particular candidate or political group. On the other hand, citizens will fail to turn out on Election Day if they fail to perceive the candidates as being able to deliver the outcomes in which they are interested. In this scenario, citizens become frustrated by the government's inability to meet their needs, and for this reason, voting is pointless.

The dispositional system cannot be the only system exerting an effect on political behavior, however. If it were, election results could be easily predicted by the degree of enthusiasm that various candidates and groups inspire in their constituents, and the emotional reactions to specific political events would ultimately have no effect. Attempts to persuade voters to reconsider their habitual positions would be fruitless because there would be no mechanism that would disrupt their reliance on habit and indicate to them that new information in the environment should be attended to and evaluated. And so,

Marcus, Neuman, and MacKuen describe the second neurological subsystem relevant to the theory of affective intelligence.

The surveillance system, like the disposition system, assesses whether or not the organism can afford to engage in some activity. Instead of weighing the ratio of resources available to the resources needed, however, the surveillance system determines how much attention the organism can devote to the task at hand. The surveillance system constantly monitors the environment for any signs of threatening stimuli. When a threat is detected, the emotion of anxiety is aroused, and the attention of the organism is redirected from the task at hand to the environment so that preparation for fight or flight can be made. The shift in attention to the environment is evolutionarily adaptive because it fosters the desire to seek out information that can be used for self-preservation purposes. For example, consider a student studying for an examination in the university library, where many distracting signs that danger is imminent are unlikely to occur. The student's surveillance system will allow him to devote all of his attention to the book that he is reading. On the other hand, consider the same student driving home for the winter break during a snowstorm. The student may have difficulty carrying on a conversation with a passenger because his attention is diverted by the treacherous road conditions. He may lower the volume of his stereo, drive more slowly, pay closer attention to where other cars are positioned on the road and the speed of those cars. Although he may be interested in what the passenger is saying, the surveillance system will not allow him to ignore the details of the environment that may be potentially dangerous to him.

The theory of affective intelligence argues that in politics, any sign that an event or candidate might be potentially harmful should cause the surveillance system to trigger

feelings of anxiety. This anxiety, in turn, should alert the individual and motivate a search for information. Marcus, Neuman, and MacKuen, then, argue that an electorate made up of anxious voters would be most similar to the classical ideal of the rational citizen. Although it may seem that an anxious but rational populace would benefit participative democracy, it should be noted that the constant search for information is taxing. Having to spend large amounts of time learning about socio-political events would prohibit involvement in other activities necessary for survival and procreation, and being kept in a continual state of anxious arousal would also take its toll, both psychologically and physiologically.

This is why human emotion is hypothesized to have evolved into a dual-system (Abelson, Kinder, Peters, & Fiske, 1982; LeDoux, 1995). While one system scans the environment for potentially threatening stimuli, the other system, in a sense, determines what sorts of stimuli should be regarded as threatening. Consider a concrete example: the disposition system of an individual deeply committed to the preservation of abortion rights has signaled to her that she has the available resources to participate in the debate and activism over this issue, which (for some reason in her socialization history) is important to her. She feels enthusiastic because she feels that she is able to make a difference, and that her work is worthwhile. When she hears that a nominee for Supreme Court Justice described as having anti-abortion stands by the media, her surveillance system notes the threat to her wellbeing, and anxiety is aroused. She then is motivated to learn as much as she can about the nominee and the actions that can be taken to prevent his confirmation. The extent that she will participate in activities organized to block the nominee will depend on how effective she feels her actions will be. If she feels that

joining other protesters will help raise awareness and garner support for their position, then her enthusiasm and likelihood of participation will also increase. If she feels that participating in rallies would be pointless on account of the likelihood that they would fail to engender further support, her enthusiasm will decrease and she is less likely to act. On the other hand, an individual who is not interested in the abortion issue at all (again, because of his idiosyncratic socialization history) will not have considered what sorts of resources or actions are necessary for being an effective participant in the abortion debate. This individual's disposition system, then, will not keep track of energy demanded and energy expended on the issue, which prevents feelings of enthusiasm for the issue from being aroused. Without enthusiasm for the issue, information in the environment about the Supreme Court nominee would fail to be interpreted as potentially threatening to the individual's wellbeing by the surveillance system. Anxiety would not be aroused. The individual would fail to divert his attention to the issue, and learning further information, let alone participating in demonstrations or discussions about the nominee would be unlikely to happen.

The theory of affective intelligence is intuitively compelling, and many analyses of ANES data collected between 1980 and 1986 support the conjecture that human emotion is made up of dual systems with distinct functions as opposed to a single approach-avoidance typology (for a review of these analyses, see Marcus, Neuman, & MacKuen, 2000). These results of these studies mirror Marcus and MacKuen's original 1993 findings: enthusiasm and anxiety about the candidates vary in response to key campaign events, are orthogonally related, and predict participation and vote choice, respectively.

Additionally, Marcus and MacKuen's theory is similar to several theories in the emotion literature. Mathews (1990, 1993) postulated that specific emotions signal to the brain which types of processes (i.e., threat detection) should be given first priority. Eysenck (1992) has argued that general anxiety disorder is the result of a biological/cognitive tendency to be hypervigilant of potential danger in the environment, consistent with the idea of an overactive surveillance system. Mogg & Bradley (1999) proposed a cognitive-motivational view of anxiety that drew heavily on LeDoux's (1995) neurological model of anxiety. They propose that a "valence evaluation system" assesses the threat level of stimuli (again similar to the surveillance system) through the integration of various sources of information. This information processing may begin in the thalamus but comes to involve the amygdala, which in turn effects a variety of cognitive and perceptual processes, including a "goal engagement system" (similar to the dispositional system) which determines if the individual has sufficient resources to respond to the threat.

For the purpose of this paper, the most important conjecture of the theory of affective intelligence is the prediction that anxiety causes attention to be shifted to the environment so that threat information can be perceived and processed. A few experimental findings support this view. When experimental subjects are presented with an array that includes one angry face and many happy faces, they are significantly faster at finding the angry face (a stimulus that appears to be inherently threatening) than subjects who must find the single happy face in a crowd of angry faces (Hansen & Hansen, 1988). Additionally, evidence supporting the theory of affective intelligence has been found with techniques from cognitive psychology. Mogg, Bradley, MacNamara,

Powys, Rawlinson, & Seiffer (2000) paired a neutral image with a disturbing image for 500 ms, and then had participants react by pressing a button when a dot appeared on the screen. Participants responded significantly faster to the dot when it appeared in the place where the disturbing image had been, suggesting that participants were automatically drawn to these pictures. These findings have been replicated with words in both clinical (generalized anxiety disorder) and normal samples using other pictures and words as stimuli (see Mogg & Bradley, 1999, for a review). While these studies suggest an automatic tendency to attend to threatening stimuli, the authors caution that the nature of the experimental tasks are very simple and more research is needed using more complex stimuli in order to understand how anxiety affects attention and processing in the real world. While people may be automatically drawn to threatening images, it is not yet understood if their attention continues to be sustained by them beyond a few hundred milliseconds. In fact, Mogg and Bradley argue that, adaptively, low-trait anxiety individuals may block low-threat stimuli so that their attention can be effectively focused on the task at hand.

What is needed, then, to better inform both the psychological literature on emotion and the political science literature on political behavior is studies that use more complex, ecologically valid stimuli and take into account a number of socio-psychological variables. Again, Marcus, Neuman, and MacKuen's work on their theory of affective intelligence represents a good starting point for this collaboration.

One psychological variable that might contribute to the tendency to attend to the political environment may be personal habit - individuals who tend to follow politics may be more inclined to become anxious or enthusiastic about the candidates. In order to

measure the effect of emotions that have been aroused by the current political environment, Marcus, Neuman, and MacKuen ran regressions that statistically controlled for the impact of individual variation in the tendency to attend to politics on reported levels of campaign interest. Once personal habit was controlled for, the effects of feeling anxious and feeling enthusiastic on campaign interest both declined by about half. However, to put this finding in perspective, ß associated with feeling anxious was .10 and ß for enthusiasm equaled .13, values similar to ß = .11 and ß = .12 for education level and strength of partisanship, respectively (effect sizes not available). The impact of level of arousal and emotion, then, is roughly comparable to the impact of education level and party identification on campaign interest. To summarize, a good portion of the variance in campaign interest is due to individual differences in political attentiveness. However, the impact of the emotions aroused by the current campaign also plays an important role in engaging the public.

Interest in the campaign, however, is only half of the story. Effective political cognition is also comprised of the search for new information about political events and candidates – a search that will be motivated by anxiety. A good empirical test of the theory of affective intelligence, then, should also include an analysis of the effect of anxiety on the respondents' ability to answer questions about current political affairs correctly. For this test, Marcus, MacKuen, and Neuman used two outcome measures: first, the number of statements that respondents were able to provide about the candidates was used, with the assumption that those individuals who paid more attention to the campaign and learned more information would be able to recall more information than respondents who paid less attention. Second, the ability of the respondents to judge

correctly which candidate was more liberal or conservative on a number of issues was used. When the amount of statements about a candidate was regressed on the emotional responses of the participants (controlling also for habitual political attentiveness, education, and strength of partisanship), the influence of anxiety was twice as strong as the influence of enthusiasm. With the more rigorous test of campaign knowledge, the effect of enthusiasm disappeared entirely, but again the effect of anxiety remained significant. Both of these findings support the tenet central of the theory of affective intelligence that anxiety motivates attention to the political environment.

Additionally, a counterintuitive hypothesis derived from the theory of affective intelligence was tested. Because anxiety is both provoked by perceived threats in the environment and contributes to the monitoring for additional threats, the authors hypothesized that strong partisans would be the first to notice signs of trouble in the administration that they support. Specifically, they conjectured that strong partisans would report higher levels of anxiety when their party was under fire for declining economic conditions than members of the opposing party. After all, these individuals stand to lose the status quo in addition to the pride and reflected glory they may have felt as part of the dominant political party, and so would become more anxious at the thought of losing this special state than members of the opposing party. A regression analysis using ANES data collected during the 1980, 1984, 1992 and 1994 presidential campaigns was conducted to evaluate the influence of partisanship (strong democrat, strong republican, and independent) on anxiety about economic conditions under the incumbent president. The r^2 value for independents was .86, and .82 for respondents that strongly identified with the supporting party, while the r^2 value for respondents who identified

with the opposing party was only .28. Clearly, the results of this analysis indicate that being a member of the dominant party does not automatically result in feelings of security and pride, as the approach/avoidance theory of emotion would predict; instead, it results in more intense negative affect when challenges to the status quo become apparent.

Although Marcus, Neuman, and MacKuen were able to provide empirical support for their theory of affective intelligence through a number of different approaches, a few critical flaws have not been addressed. Perhaps most importantly is their source of data. By using the ANES data set, the authors were constrained to the questions that were posed to the respondents. Because this survey did not include a direct measure of the specific construct of anxiety, Marcus, Neuman, and MacKuen were forced to use a factor that correlated with negative affect items, which may or may not be a proxy of anxiety. The same is true for the measurement of enthusiasm. Because these constructs are central to the theory, further work is needed that operationalizes and measures the constructs in a more valid way.

Additional questions about the theory of affective intelligence are raised by findings in the social cognition literature. Eyesenck (1992) found that negative affect states such as anxiety and depression are actually associated with a decrease in performance on demanding cognitive tasks. Although a consensus has not yet been reached on how negative affect influences cognitive processes (Matthews & Wells, 1999), Eysenck (1992) and Sarason (1984) have argued that the diversion of attention away from the task at hand and onto the self or the preoccupation with the anxiety is likely involved. These findings from the field of social cognition are more aligned with

the findings advanced by psychologists Sheldon Solomon, Jeff Greenberg, and Tom Pyszczynski (1991) in their theory of terror management.

Terror Management Theory

Just as Marcus, Neuman, and MacKuen drew from evolutionary theory and the neuroscience literature to create their theories about the disposition and surveillance system, Solomon, Greenberg, and Pyszczynski also adopt an evolutionary perspective of human motivation. They argue that human beings, just as all animals, are instinctively driven toward self-preservation. The motivation to avoid injury and death is genetically based and strong. Unlike animals, however, human beings have the cognitive capacity to understand and be aware of death. In fact, the awareness that total annihilation of the self could occur at virtually any moment is a continual source of anxiety.

Several studies within the terror management framework have demonstrated that participants distract themselves from death-related thoughts following an experimental manipulation that makes their own death salient to them (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Pyszczynski & Greenberg, 1987, 1982). For example, Greenberg et al. (1994) induced mortality salience and then asked their participants to work on a word completion task. This task was comprised of 20 word fragments that could be completed as death-related or death-unrelated words. For example, "coff__" could be completed as either "coffee" or "coffin". If death-related thoughts were active in working memory, individuals would be more likely to complete the words as death-related. Half of the participants in each condition completed this task after reading a boring passage designed to distract them from the mortality salience they had just

endured, while the other half completed the task immediately following the salience induction. Participants completing the word task immediately following the mortality salience induction created significantly less death-related words than the mortality salience plus delay condition, suggesting a tendency to push death-related thoughts out of mind as soon as possible.

Consistent with this interpretation are a variety of studies looking at the effect of cognitive load and avoidance of death-related stimuli. Arndt, Greenberg, Solomon, Pyszczynski, and Simon (1997) induced mortality salience in participants by having them write down their thoughts about their own death. Half of the participants were then given an 11-digit number, ostensibly to be remembered during a later part of the study. The participants who had the cognitive burden of mentally rehearsing the number showed increased activation of death-related thoughts, as demonstrated on the same word completion task used by Greenberg et al. (1994). These findings suggest that the mortality salience induction activates death-related thoughts, and that cognitive resources are necessary for suppressing them. The low number of death-related words completed by the control group that was not rehearsing the number suggests that when ample cognitive resources are available, they are immediately used to push death-related thoughts out of conscious awareness.

The results of these studies, and others like them lead Pyszczynski, Solomon, and Greenberg (2003) to conclude that "the initial responses to mortality salience is to engage in simple, direct, threat-focused defenses that enable the individual to get death-related thoughts out of consciousness" (p. 59). These researchers, then, would predict that people are less likely to expose themselves to anxiety-provoking information when their

deaths are made salient. Instead, individuals are likely to try to minimize the threat, by avoiding information related to the threat, minimizing the apparent threat by altering perceptions of its severity, or denying vulnerability to the threat. Human beings, according to these authors, need continual assurance that trauma is unlikely, and seek refuge from the terrifying idea of death. In addition to pushing death-related thoughts out of mind, another coping mechanism is culture.

Culture is central to terror management theory. Its developers argue that cultural worldviews are constructed and internalized so that an individual can achieve a sense of security by feeling as though he or she is a valuable member of a meaningful community. Instead of consciously dwelling on the immanency of death, humans instead become preoccupied with the values of the culture to which they belong. Because many cultures give prominent roles to religious systems, individuals may take comfort in the idea that adherence to the values prescribed by their culture will result in actual immortality in a spiritual realm after physical death. But even for individuals who do not subscribe to religious beliefs, something like immortality can be achieved through participation in the larger culture, whether through children or even ideas that have left a mark on the world.

Solomon, Greenberg, and Pyszczynski posit that culture is understood through a cognitive framework that underlies all psychological processes and serves two purposes: first, it strongly motivates self-preservation, and second, it attempts to minimize distress and anxiety about the world through the control of conscious awareness and an understanding of the laws and forces that govern it. These authors argue that this worldview is a fragile social construction that requires continuous maintenance to function. The failure of the worldview to defend the individual against existential angst

would have serious repercussions for the emotional stability and cognitive functioning of the individual; therefore, the way in which one understands the world must be continually defended against threats.

Threats to the worldview may come in the form of competing belief systems. Exposure to convictions that run counter to those upheld by the individual make salient the possibility that the individual's worldview may not be valid. Furthermore, exposure to other standards of behavior and cultural values leads to uncertainty about one's ability to live up to these standards and values, which in turn compromises self-worth and engenders anxiety. The doubt that is experienced when other worldviews are encountered, along with the inevitable reminders that death could suddenly occur result in a continual need for ongoing confirmation of the validity of the adopted worldview and value as an individual.

In short, the developers of terror management theory argue that threats to an individual's worldview will cause anxiety, which will in turn motivate that individual to protect his or her worldview and self-esteem. This conjecture, coupled with the assertion that individuals are motivated to push death-related thoughts out of mind after death has been made salient, asserts exactly the opposite of the theory of affective intelligence. Instead of viewing anxiety as motivator for both the search for objective information and the rational evaluation of that information, terror management theory views anxiety as an impediment to rationality, a force that not only halts the motivation to consider alternate viewpoints, but actively guards against it. Terror management theory, then, would assert that the anxiety aroused by exposure to different viewpoints in the political environment

would only serve to strengthen the positions and viewpoints already held by the individual citizen.

There is an abundance of experimental evidence to support the conjecture that individuals attempt to defend their worldview when made anxious. One of the most compelling studies examined the effect of mortality salience on the tendency to stereotype outgroup members (Schimel, Simon, Greenberg, Pyszczynski, Solomon, Waxmonsky &Arndt, 1999). The experimental group of participants was asked to fill out a questionnaire that made them consider their own death, while the control group filled out a questionnaire about dental hygiene (presumably a topic that would not arouse anxiety). An African-American confederate was present while the participants filled out the questionnaires. For half of the participants, the confederate was dressed in clothing consistent with the stereotype of African Americans predominate in American culture (i.e., "hip hop style" clothing), while for the other half of the participants, the confederate was dressed in a manner inconsistent with the cultural stereotype of African Americans (i.e, "preppy" clothing). After completing the questionnaires that served as the experimental manipulation, the participants were asked to participate in a study on impression formation, and wrote essays about the other person who had been present in the laboratory with them. The results indicated that the participants in the mortality salience condition provided more positive evaluations of the African American confederate when he confirmed predominant cultural stereotypes by wearing the hip hop clothing than when he defied the cultural stereotype by wearing preppy clothes, while the exact opposite was true for participants who did not undergo the mortality salience

induction. These findings suggest that feeling anxious hinders objective information processing.

A cognitive test of the effect of mortality salience on information processing was provided by Arndt, Greenberg, and Cook (2002). Using word fragment completion tasks and lexical decision tasks in order to determine the relative accessibility of certain constructs in memory, these researchers found that worldview-relevant constructs (operationally defined as nationalistic statements) became activated for participants who were primed with mortality salience words, but not for participants who were primed with pain or failure words. These findings are consistent with the conjecture that anxiety aroused over the prospect of death can be mitigated by internalizing the cultural worldview, and provide further evidence that negative affect interferes with an objective search for information from the environment.

In addition to these two studies described above, the effects of mortality salience on worldview defense has been shown to effect a diverse range of social psychological phenomena, including feelings of nationalism and patriotism (Greenberg, et al., 1990); reporting of political attitudes and beliefs (Pyszczynski, et al., 1996); perception of outgroup members (Greenberg, et al., 1994; Nelson, Moore, Olivettie & Scott, 1997); aggression (McGregor, 1998); risk taking (Taubman Ben-Ari, Florian, & Mikulincer, 1999); prosocial behavior (Jonas, Schimel, Greenberg, & Pyszczynski, 2002); ingroup identification (Castano, Yzerbyt, Paladino, & Sacchi, 2002; Dechesne, Janssen, & van Knippenberg, 2000); desire for commitment in romantic relationships (Florian, Mikulincer, & Hirschberger, 2002) and perceptions of guilt in the legal system

(Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989), among other constructs as well.

Terror management theorists argue that the extensive body of literature on the self-serving bias can be interpreted as evidence supporting terror management theory (Pyszczynksi, Solomon, & Greenberg, 2003). This literature has shown that threats to self-esteem, such as being told that one has failed on a test of some ability important to the self-construct increase anxiety. Furthermore, these threats elicit self-protective behavior in the participants. For example, participants may deny the importance of that particular ability to his or her sense of self-worth, denigrate the test or the experimenter, create or claim handicaps that disrupted their performance, inflate their descriptions of their ability in other domains, and selectively seek information that enables them to uphold a self-serving interpretation of the failure (Greenberg, Pyszczynski, & Solomon, 1986). Taken together, these findings again demonstrate that feeling anxious motivates the defense of the existing worldview.

Research by cognitive psychologists has also demonstrated that anxiety is disruptive to efficient processing. Reed (1977) found that anxious participants show deficits in their ability to reason inductively, while Fransson (1977) found that anxious individuals exhibit shallow information processing. Memory effects are also well-documented; Idzihowski & Baddeley (1987) found that anxious participants showed significant decreases in working memory capacity compared to non-anxious individuals. Kent (1985) demonstrated that anxious individuals tend to selectively remember negative information. In an fMRI study, Erk, Kiefer, Grothe, Wunderlich, Spitzer, & Walter (2003) found that state-anxious individuals showed poorer recall for lists of neutral words

compared with individuals in a positive or neutral mood state. Anxious individuals showed increased activity in the amygdala while attempting to encode the word lists, while positive-state and neutral-state participants showed increased activity in the parahippocampus and prefrontal cortex, respectively.

Blascovich and his colleagues have shown that performance declines when individuals appraise a difficult task as a threat rather than a challenge across a variety of situations (see Blascovich & Mendes, 2000, for a review). For example, female dog owners were asked to perform a serial subtraction task alone, in the presence of their dog, or in the presence of their best female friend. With the dog present, little or no physiological changes occurred and the participants made few errors. Participants who subtracted alone showed a physiological pattern (increased blood pressure) indicative of a threat appraisal and made significantly more errors, but not as many as the participants who had a friend present. It seems that the added stress of being evaluated by someone on a difficult cognitive task raised anxiety and decreased cognitive efficiency. (The dog, the experimenters speculated, caused the participants to feel secure in an attachment sense, and this calming effect allowed for greater cognitive efficiency) (Allen, Blascovich, Tomaka, & Kelsey, 1991). Eysenck (1992) argues that anxiety impairs cognitive efficiency through an additional processing burden – anxious individuals "worry" or have negative-affect laden thoughts or images activated in working memory that impedes efficient processing of other material.

Additionally, it appears that anxiety can also influence attention. MacLeod, Mathews, & Tata (1986) presented subjects with pairs of threat and neutral words on a screen for a brief period and measured the time it took participants to respond to the

presentation of a dot after the words disappeared. Participants were faster when the dot appeared closer to the neutral word, suggesting that they were automatically avoiding the threat words. This finding is the complete opposite of what Mogg et al. (2000) found using a similar paradigm, with pictures instead of words. In her study, participants were automatically drawn toward the threat stimulus. Even with automatic responses to simple stimuli, results conflict.

How, then, can the inconsistencies in the findings supporting the theory of affective intelligence and the terror management theory be reconciled? A look at some methodological issues common to both studies provides an answer. While both theories attempt to describe the influence of anxiety on the search for and processing of information, both theories use different operational definitions of anxiety. The researchers working on the theory of affective intelligence, which has garnered more attention in the political science literature than in the psychology literature, have relied on large databases to test their theories. While this approach allows them to test their hypotheses on thousands of subjects, it denies them precise control over the operationalization of the construct they are attempting to study. Marcus, Neuman, and MacKuen report consistent findings that their factor correlated with negative affect terms and predicts behaviors and attitudes associated with a search for objective information, a finding that requires and deserves further study in order to determine if this predictor is, in fact, anxiety. Researchers in the terror management camp, on the other hand, have narrowly defined anxiety to include mortality salience. While this type of anxiety no doubt exists in most people from time to time, it seems unlikely that a preoccupation with

one's own death is aroused each time an individual turns on the news channel. What is needed, then, is a uniform, valid definition of anxiety that mirrors an affective state that could conceivably be aroused during naturally occurring media consumption. Controlling the definition of anxiety would allow for the direct comparison of the theory of affective intelligence against terror management theory in order to determine which hypothesis best describes the influence of anxiety on information search behavior.

In addition to the inconsistencies with the way anxiety has been operationalized and manipulated, the way it has been measured is problematic as well. The existing studies have measured anxiety only once, after the participants have been exposed to the anxiety-provoking stimulus, and have relied on self-report. A stronger methodology would incorporate measurement before, during, and after exposure to anxiety-provoking information in order to assess the effectiveness of the manipulation, as well as use behavioral measures.

Additionally, the existing studies have not tested the possibility that individual differences exist in preferences for anxiety coping techniques, such as information seeking. Research in the field of health psychology, for example, has found that some individuals about to undergo a painful procedure (vaginal colposcopy) feel less stress when they are exposed to detailed information regarding the procedure, while for other individuals, anxiety increases with information exposure (Miller, 1996). A similar effect may exist in the processing of political information as well - some individuals may feel less threatened when they have more information about alarming socio-political events, while others feel more overwhelmed and anxious when presented with detailed information. Testing for the existence of these differences and the variables that may

mediate or moderate them, such as the ability to interpret and organize complex information that may not be structured in a way that is most conducive to learning (as suggested by Bar-Tal, 1994) would allow for more variance in political behavior in the face of frightening events to be explained.

The present study, then, advances the literature on political information seeking and processing in the face of anxiety-provoking events in three ways: first, it provides a more rigorous test of each theory by introducing manipulation and measurement that is more tightly controlled than the research that has been published on the topic to date.

Second, it directly tests the theory of affective intelligence against terror management theory, which has not yet been done in the political science or psychology literature. Specifically, I hypothesize that participants will seek out more information and demonstrate better recall for this information when they are made moderately anxious about a particular event; that is, anxiety will motivate a search for information when a threat is present, but not overwhelming. On the other hand, I hypothesize that high levels of anxiety associated with a sense of personal vulnerability will be associated with decreased information search, poor recall for information content, and a reliance on previously-held political attitudes and stereotyped information – hypotheses consistent with the current findings on the disrupting effect anxiety has on higher-order cognitive processes (Eyesenck, 1992). Participants with low levels of anxiety arousal are expected to show less preference for information exposure than both the medium and high anxiety groups because their motivation to collect information should not be sufficiently piqued. In short, I hypothesize that both theories are correct, depending upon the level of anxiety that the environmental context will arouse.

Third, this study assesses effects of individual differences in the ability to tolerate anxiety, which may further our understanding of the processes that mediate the search for information under anxiety-provoking conditions. I predict that individual differences will be found on the preference for more or less information about a threatening event, and that these differences may be affected by demographic factors, such as level of pre-existing knowledge about the threat, as well as psychological factors, such as the need for cognition and anxiety. Taken together, the aim of these research questions is to further understand the process in which people gather the information that will serve as the basis for their political decisions.

CHAPTER 2

METHOD

Participants

Three hundred and two University of New Hampshire undergraduates were recruited from the Psychology Department's subject pool to participate in the study for course credit. The sample was comprised of 68 males (22.51%), and 234 females (77.48%). The mean age of the participants was 19.48 years, with a standard deviation of 1.68 years. Freshmen made up 47.4% of the sample, while sophomores comprised 27.8%, juniors 15.9%, seniors 7.6%, and other students (such as non-degree or graduate students) 1.3%. The overwhelming majority (94.7%) of the participants were Caucasian. Almost half of the sample (49.7%) reported a permanent home address in New Hampshire, while 26.8% reported Massachusetts, 13.9% reported a permanent address in another New England State, 7.9% reported being from a State outside New England, and 1.7% reported a home address outside of the United States. Please refer to Table 1 for a breakdown of participants' home addresses by region.

Table 1
Participants' permanent address locations

Area/State	Frequency	Percent
Southern NH	112	37.10
MA	81	26.80
Central NH	26	8.60
Outside NE	24	7.90
CT	19	6.30
Northern NH	12	4.00
RI	9	3.00
ME	8	2.60
VT	6	2.00
Outside US	5	1.70

Although about half of the sample (53.6%) reported that they knew that the Seabrook Nuclear Power Plant existed prior to participation in the study, most participants reported that they knew little (34.1%) or very little (44.0%) about nuclear power prior to participating. Of the remaining group, 18.9% reported that they knew a fair amount about nuclear power, 2.3% reported that they knew a lot, and .7% reported that they knew enough to be considered an expert. Prior to participating in the study, 44.0% of participants reported that they were not concerned at all about the safety of nuclear power plants, while 34.8% reported a little concern, 16.2% reported a moderate amount of concern, 4.6% reported that they were very concerned, and .3% reported that they were very concerned.

Materials and Design

Manipulation articles

In order to manipulate anxiety, participants were randomly assigned to read one of four passages that were described as "articles that are similar to what you would read on an online news source." The articles were all approximately the same length (the mean was 808.25 words per article with a standard deviation of 108.10 words). Anxiety was manipulated two ways: first, through the safety message contained in the article (that nuclear power plants are generally safe, or that they are generally unsafe), and second, through the personal threat of danger (that there is a nearby plant that has been threatened, or no mention of the nearby plant).

The study contained four conditions. In the low anxiety condition, participants read an article stressing the safety of US nuclear power plants, without specific reference to the nearby Seabrook plant. This condition can be described as the "safe message, no personal threat" condition. Two medium anxiety conditions were included: in the first, participants read an article stressing nuclear power plant safety specific to the nearby Seabrook plant. Because of the personal relevance of this article, this condition can be described as the "safe message, personal threat" condition. In the second medium-anxiety condition, participants read an article about serious safety concerns at US power plants, but with no specific mention of the Seabrook plant (the "unsafe, no personal threat" condition). And finally, in the high-anxiety condition, participants read about serious safety concerns at the nearby Seabrook plant (the "unsafe, personal threat" condition).

Measures

All of the measures were administered to participants using a web-based survey on Dell computers using the Windows operating system. The Brief Mood Introspection Scale (Mayer & Gaschke, 1988) was used to measure current mood state (including anxiety) before and immediately after the manipulation. After the presentation of the manipulation article, participants also completed a brief (8-item) questionnaire designed to measure bound anxiety - their anxiety specifically related to nuclear terrorism. They were then automatically directed to a webpage containing links to further information about nuclear power plant safety (described below). A software program, StatCounter, tracked the movements within the website for each of the participants, including the number of links that the participant visited, the order in which the links were visited, and the amount of time that was spent on each of the links.

After the free-search period, participants completed the Need for Evaluation Scale (Jarvis & Petty, 1996) and the Miller Behavioral Style Scale (Miller, 1987) in order to assess individual differences in the preference for information exposure. Additionally, participants completed the 10-item Brief Big Five measure (Gosling, Rentfrow, & Swann, 2003) and a measure of trait anxiety (the BMIS scale, modified to measure trait emotion). Although trait anxiety was included as a covariate in the analyses, it was measured after experimental manipulation for two reasons: first, exposure to several mood state and trait measures prior to the manipulation might have enabled participants to identify emotion as a primary variable of interest in the

study, thus introducing the possibility of bias; and second, participants' levels of anxiety were somewhat elevated upon entering the psychology laboratory. The completion of the trait anxiety measure at the end of the study may have provided more accurate data about the typical emotion traits of the participants. After demographic data was collected, the participants completed a brief (5 item) recall test for the information presented in the manipulation article.

Experimental Website

The website in which the participants could search contained eight links to articles containing further information about nuclear terrorism. Four of the articles contained safety-threatening information, including how to survive a nuclear blast; information about terrorists' interests in nuclear technology; information about what happens during a nuclear explosion; and first-person accounts of the Chernobyl nuclear disaster. The other four articles contained reassuring information about the safety and benefits of nuclear power, including the long history of safety of nuclear power plants worldwide; information about the economic and environmental benefits of nuclear power; an editorial criticizing groups who believe that US nuclear power plants are vulnerable to terrorism; and detailed information about the safety regulations at US plants. The content of these articles was collected from a variety of sources, including *National Defense* magazine (Stanton, 2002), the Nuclear Energy Institute's website (www.nei.org), books by experts in the field (i.e., Allison, 2004), a BBC special report on the anniversary of the Chernobyl disaster (BBC, 2006), the website of the Nuclear Regulatory Commission (www.nrc.gov), and the online Nuclear Weapons Archive (www.nuclearweaponarchive.org). The content collected

from these sources was then summarized and reported in the format of an article that would appear in an "in-depth" section of a news website.

Additionally, 5 filler links were included under the headline "In other news." These links (about Mexican elections, childhood health issues, a real estate bubble, the recall of the drug Vioxx, and the looting of the Iraqi National Museum) gave participants the option of not reading about nuclear terrorism, preventing meaningless search behavior. These articles were obtained through Seacoastonline.com, CNN.com, and Boston.com.

The main experimental website that contained the links to the above-described articles was modeled on an "in-depth" section of a news website, specifically, the BBC special report on the anniversary of the Chernobyl disaster (BBC, 2006). This main page contained a banner at the top reading "NHNews.com" and featured a picture of a nuclear power plant in the upper left corner. Under text that read "Is Nuclear Power Safe?" were eight images, each of which were links to the reassuring and threatening articles. Shortened versions of the articles' titles appeared below their corresponding link images. For example, the link to the article describing the events that occur during a nuclear explosion featured a picture of a fiery cloud and the caption "What happens in a nuclear explosion?" The links to the filler articles did not contain pictures, and were listed vertically on the left side of the page. Please see Appendix D for a screenshot of the main page.

Although the content of the website was written and designed by the experimenter, the website itself was constructed by Zachary Ambrose, a professional website developer who works for an electronic publishing firm in New York City.

Procedure

The data collection sessions lasted for approximately 55 minutes. Originally, all the data were supposed to be collected in a "super-tech" classroom containing 30 computers. However, due to limited availability of this room, data were also collected in a smaller room containing 4 computers. Approximately half of the data were collected from groups of 4 or fewer participants, and half from groups of 10 or larger.

Upon entering the laboratory, participants were given oral instructions. The script for these instructions is as follows:

> "The purpose of this study is to identify factors that influence how people use internet news sources. First, you will be asked to answer some questions, mostly about your current mood state. Then you will be reading a news article, something similar to what you might see on an online news website. After the article, there will be some more questions, and then you will have approximately half an hour to explore a website that contains links to further information about the article you read. Stay within that one website, and I will stop you with further instructions after about a half hour. There will be some more survey questions, and then you will be all set to go. Are there any questions?"

If there were no questions, the participants were asked to sign their consent forms. Additionally, they were asked to record their name, student identification number, and instructor's name on an index card that was selected from a stack of pre-shuffled cards that contained the numbers 1-4, referring to the manipulations. Participants were assigned to the condition number that was randomly drawn out of the deck of shuffled cards, so that multiple conditions were run simultaneously. The

students were then directed to the experiment's website, given the site's username and password, and were told to enter the number on their index card.

The time at which the students entered their numbers into the website was noted, and the participants were allotted 33 minutes to complete the BMIS, read the manipulation article, complete the BMIS and bound anxiety measure, and engage in the free search on the experiment website. After 33 minutes had passed, the participants were asked to continue with the experiment by moving on to the questionnaires. They completed, in order, the BMIS, the bound-anxiety measure, the MBSS, the Need for Evaluation Scale, the Brief Big Five measure, the trait BMIS, a demographics survey, the BMIS and bound anxiety measure again, and then the recall test.

Participants in the unsafe message conditions were thoroughly debriefed through an oral presentation about the differences between nuclear power plants and nuclear bombs, and the safety precautions that would prevent a nuclear plant from exploding like a bomb (see appendix A for debriefing materials). The other participants were debriefed with a written statement about the purpose of the study and the minimal risks that nuclear power plants pose to local populations. All of the participants were encouraged to take a debriefing form specific to their condition upon leaving the laboratory.

CHAPTER 3

RESULTS

State Anxiety Measure

In order to measure state anxiety, participants completed the Brief Mood Introspection Scale, a general mood measure. Again, these ratings were collected at four points during the experimental session: immediately before the anxiety manipulation, immediately following the anxiety manipulation, immediately following the free-search period, and upon completion of the other scales used as part of this experiment.

In order to obtain a measure of anxiety from the BMIS, a principal components factor analysis with Varimax rotation was conducted on the data obtained from the first administration of the BMIS. Four factors that were consistent with prior work on the BMIS emerged with eigenvalues greater than 1: a pleasant-unpleasant factor, a positive-relaxed factor, a negative-tired factor, and an anxiety factor. Together, these four factors explained 58.29% of the variance after rotation. Because the fourth factor, anxiety, is the most relevant to the present study, the discussion will be limited to this factor.

The anxiety factor, which explained 12.39% of the variance after rotation, was correlated with the items nervous, jittery, and calm (reverse-scored). Each of these three items had strong to moderate loadings on the factor (.72, .78, and .56, respectively), No other item on the BMIS had a loading on this factor greater than .31.

Unit-weighted scale scores were computed for these items for each BMIS administration. The Cronbach α internal reliabilities of the anxiety scale for each of the

four administrations of the BMIS were .63, .67, .57, and .44, in order from first administration to last.

State Anxiety Manipulation Check

In order to determine if the experimental manipulation affected participants' anxiety level, two analyses of variance were conducted. First, a two-way (safety message x personal threat) repeated measures ANOVA was conducted on the 4 anxiety scores obtained from each participant. Please refer to Table 2 for the mean state anxiety ratings by condition.

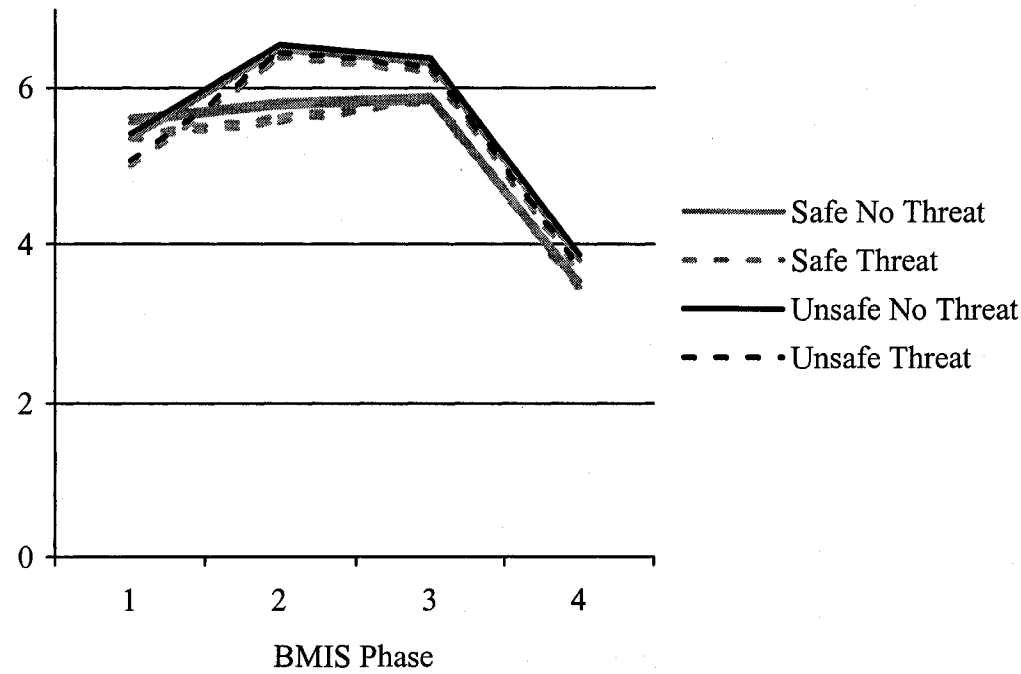
Table 2
Means and standard deviations of state anxiety scores

Condition	Baseline	Post-manipulation	Post-search	Post-Survey
Safe Message No Threat	5.63 (1.98)	5.84 (1.80)	5.90 (1.77)	3.53 (1.31)
Safe Message Personal Threat	5.43 (1.72)	5.64 (1.79)	5.91 (1.63)	3.51 (1.15)
Unsafe Message No threat	5.41 (1.75)	6.55 (1.99)	6.38 (1.78)	3.87 (1.30)
Unsafe Message Personal threat	5.07 (1.94)	6.45 (2.11)	6.28 (2.08)	3.69 (1.43)

A main effect was found for anxiety across time, Wilk's Λ=.21, $F(3,296)$=362.10, $p<.001$, partial η^2=.79. A polynomial analysis of these scores showed a significant quadratic trend, $F(1,298)$=461.57, $p<.001$, partial η^2=.61. An anxiety measurement occasion x message interaction was also found, Wilk's Λ=.92, $F(3, 296)$=8.79, $p<.001$, partial η^2 = .08. Participants who read an unsafe message showed a significant increase in anxiety immediately after the manipulation $t(145)$=7.93, $p<.001$, d=.66. Their anxiety levels did not change during the search period. After completion of the surveys,

however, reported anxiety levels dropped significantly from the post-manipulation reading $t(145)=3.62$, $p<.001$, $d=.30$. Participants who read a safe message, on the other hand, did not show a significant increase in anxiety after the manipulation or after the search period; the only significant differences found within these participants' anxiety ratings were between the final BMIS administration (the lowest score) and the baseline score and each of the other administrations, $t(155)=3.28$, $p=.001$, $d=.26$, $t(155)=17.15$, $p<.001$, $d=1.47$, and $t(155)=19.79$, $p<.001$, $d=1.60$ for the comparison between the final BMIS scores and the baseline, post-manipulation, and post-search period BMIS scores respectively. The type of message, then, had significant effects on anxiety levels, while the level of threat (personal or not personal) did not affect anxiety scores. Please see Figure 1.

Figure 1
Changes in state anxiety ratings across time



In order to control for any effect of trait anxiety, a between-subjects ANCOVA was conducted on the participants' anxiety scores immediately following the manipulation. Trait anxiety was measured with an adaptation of the BMIS to measure mood traits, and contained the same three items that comprised the state anxiety measures: nervous, jittery, and calm (α=.46). Trait anxiety was found to be a significant covariate, $F(1,297)=40.59$, $p<.001$, partial $\eta^2=.12$. Controlling for trait anxiety, the effect of the safety message was still significant, $F(1,297)=17.75$, $p<.001$, partial $\eta^2=.06$. No other main effects or interactions were found.

Finally, in order to control for the effects of the believability of the manipulation article and previous knowledge of the existence of the Seabrook plant, these variables were also added into an ANCOVA model as covariates. Neither of these variables produced a significant effect on anxiety levels following the manipulation.

To summarize, anxiety levels did change significantly over time. However, only one factor had an effect: participants who read articles about safety concerns at nuclear power plants experienced a significant increase in anxiety, and their anxiety levels remained elevated until the completion of the search period. The factor that represented personal relevance of the threat did not have an effect. In fact, even when the repeated measures ANCOVA was run controlling for previous knowledge of the existence of the Seabrook plant, the effect of the safety message was still statistically significant, Wilk's $\Lambda=.92$, $F(1,299)=26.04$, $p<.001$, partial $\eta^2=.08$.

Bound Anxiety Measure

In addition to general state anxiety, anxiety specific to terrorism was also measured. Bound anxiety was measured three times, each time immediately following the

administration of the BMIS: after the experimental manipulation, after the search period, and at the completion of the questionnaires. Because the items on the bound anxiety questionnaire might have indicated the true nature of the experiment, this questionnaire was not administered with the BMIS prior to the experimental manipulation. Thus, no baseline measure of anxiety related to terrorism was obtained.

The brief bound-anxiety measure, created by the experimenter, included four items designed to assess current feelings about anxiety specific to terrorism. Participants responded to the items by choosing the number on a four-point scale that best represented the degree to which they felt the following: "anxious about terrorism and other catastrophic events", "afraid of events that I cannot control", "scared that my family, friends, and I are not really safe", and "worried that it is only a matter of time before another terrorist attack occurs." In addition to these four terrorism-related items, four filler items were also included in the measure: "satisfied with the precautions the government is taking to keep our homeland safe," "upset about the damage to our environment", "pleased with nuclear power as a clean, sustainable, and safe energy source", and "relieved about the progress that has been made in fighting Al-Qaeda." These items were included to disguise the true nature of the bound anxiety measure.

A principal components factor analysis with Varimax rotation was run on the data yielded by the first administration of the bound anxiety measure. As expected, two factors emerged: one that was correlated with each of the four items designed to measure anxiety specific to terrorism (factor loadings were .81, .80, .81, and .77 respectively, for each of the items as they are listed above) and one that was correlated with the filler items related to satisfaction with the progress that has been made in the fight against

terror (these items were "relieved about the progress that has been made in fighting Al-Qaeda", which had a factor loading of .79; "Pleased with nuclear power as a clean, sustainable, and safe energy source, which had a factor loading of .72; and "satisfied with the precautions the government is taking to keep our homeland safe, which had a factor loading of .64). The first factor explained 37.65% of the variance after rotation, and the second factor explained 18.80%.

Just as for the BMIS, unit-weighted scale scores were computed from the items that were correlated with the factor measuring anxiety specific to terrorism. Cronbach α reliabilities were computed for each of the three administrations of the bound anxiety scale. For the first administration of the scale, $\alpha = .82$, the second administration yielded $\alpha = .86$, and for the final administration, $\alpha = .90$.

Bound Anxiety Manipulation Check

Just as with the general anxiety measure, a repeated measures analysis of variance was conducted on the scores from the bound anxiety ratings as well. Please refer to Table 3 for the means.

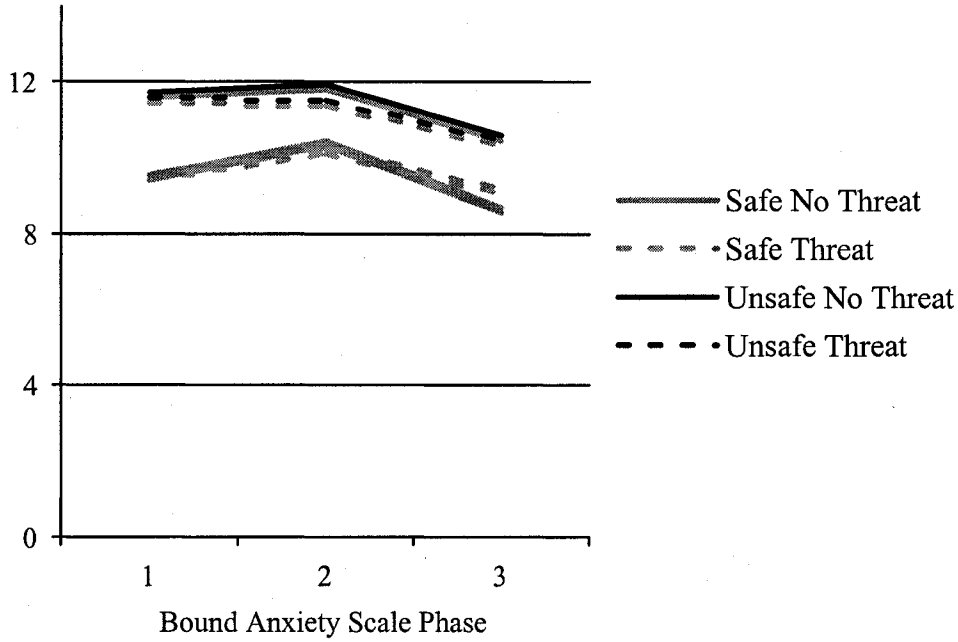
Table 3
Means and standard deviations of bound anxiety scores

Condition	Post-manipulation	Post-Search	Post-Survey
Safe Message No Threat	9.53 (2.67)	10.44 (3.07)	8.72 (3.27)
Safe Message Personal Threat	9.53 (2.85)	10.22 (3.30)	9.18 (3.54)
Unsafe Message No Threat	11.71 (2.56)	11.93 (2.37)	10.63 (3.08)
Unsafe Message Personal Threat	11.63 (2.64)	11.49 (2.84)	10.44 (2.26)

A pattern similar to that of the BMIS results was found: there was a significant main effect for time, Wilk's Λ=.78, F=44.35, p<.001, partial η^2=.23. The trend was quadratic, F(1, 298)=80.02, p<.001, partial η^2=.21. Participants who read an unsafe message about nuclear power had significantly higher bound anxiety ratings than participants who read a safe message, Wilk's Λ=.95, F(2,297)=7.26, p=.001, partial η^2=.05. Between subjects contrasts found a significant difference between the safe message and unsafe message groups at each measurement interval: t(300)=6.93, p<.001, *d*=.80, t(300)=4.08, p<.001, *d*=.47, and t(300)=4.19, p<.001, *d*=.47 for the first, second, and third measurements, respectively. For the group that read the unsafe message, bound anxiety levels did not change between the experimental manipulation and the search period, but showed a significant decrease between the post-manipulation and post-survey completion measures t(145)=5.52, p<.001, *d*= .46. For the group that read a safe message about nuclear power, bound anxiety levels were significantly higher than the post-manipulation reading after the search period, t(155)=5.71, p<.001, *d*=.61, but a significant decrease was observed between the post-search and post-survey completion readings, t(155) = 7.67, p<.001, *d*=.23. Please refer to Figure 2.

To control for the effect of trait anxiety, a between-subjects ANCOVA was run on the bound anxiety scale that was administered after the manipulation. Trait anxiety was found to be a significant covariate, F(1,297)=11.21, p<.001, partial η^2=.04. Controlling for trait anxiety, there was still a main effect for safety message, F(1,297)=53.25, p<.001, partial η^2=.15. After the anxiety manipulation, then, participants who read the unsafe message had significantly higher bound anxiety scores than participants who read a safe message. No other main effects or interactions were found.

Figure 2
Changes in bound anxiety ratings across time



Search Behavior

After reading the manipulation article, participants were allotted 33 minutes in which to freely search a website that contained links to three different types of articles: 4 articles that stressed the threat posed by nuclear power, 4 articles that highlighted the safety record and benefits of nuclear power, and 5 filler articles unrelated to nuclear power. The major dependent variables of interest were the number of visits to each of the types of articles, the amount of time spent reading each of the types of articles, and the order in which the types of articles were visited.

Preliminary analyses revealed large differences in preference for article type collapsed across conditions. The participants had a strong preference for articles containing threatening information, measured both by number of visits to these articles,

$F(2,903) = 56.30$, $p<.001$, partial $\eta^2=.11$, and the amount of time spent on them, $F(2,903)=596.14$, $p<.000$, $\eta^2=.57$. Please see Table 4 and Figures 3 and 4.

Table 4
Mean times (in seconds) and number of visits to websites containing threatening, reassuring, and filler articles

Article Type	Mean Time (SD)	Mean Visits (SD)
Threatening	922.31 (373.32)	3.07 (1.29)
Reassuring	333.08 (275.84)	2.36 (1.63)
Filler	128.83 (206.26)	1.67 (1.87)

Figure 3
Mean time (in seconds) spent on websites containing threatening, reassuring, and filler articles

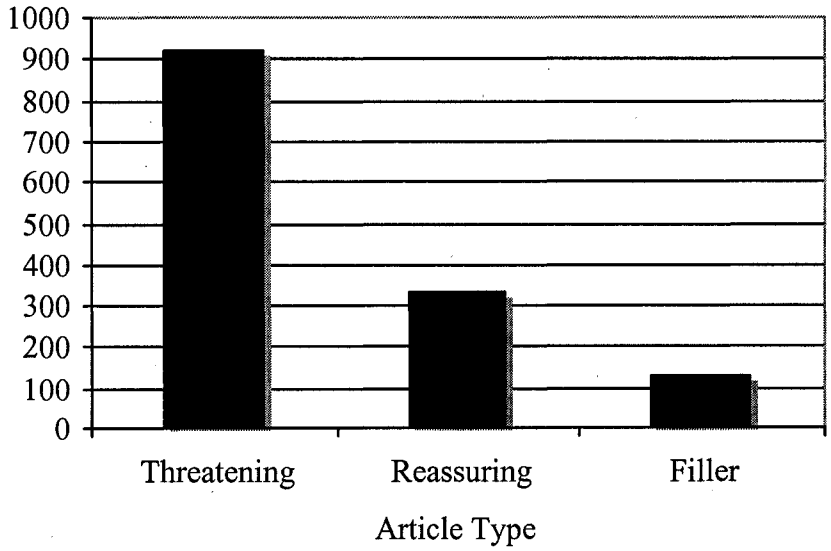
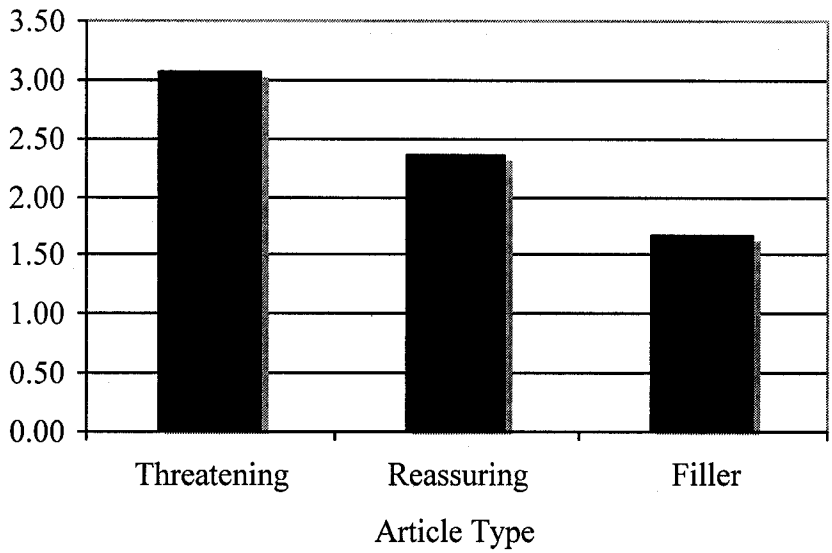


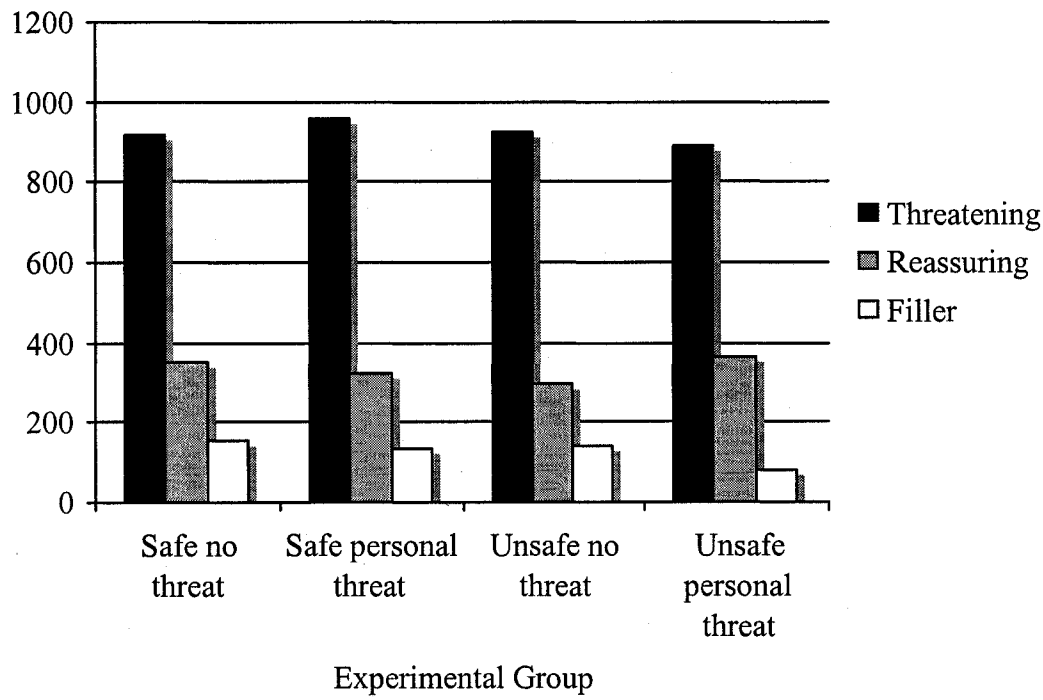
Figure 4
Mean number of visits to websites containing threatening, reassuring, and filler information



In order to assess differences in preference for information exposure between the experimental groups, a series of 2 x 2 (safety message x personal threat) between subjects ANCOVAs was conducted, with time spent on each type of website and number of clicks on each type of websites as the dependent variables. Trait anxiety was again included as a covariate. No main effects or interactions were found; the experimental groups did not differ in their search behavior. Please see Figure 5.

Additionally, participants were divided into high, medium, and low anxiety groups. The same 2 x 2 ANCOVA was conducted on the time spent on each of the websites for these groups. No significant main effects or interactions were found.

Figure 5
Distribution of time (in seconds) spent on threatening, reassuring, and filler websites by condition



To test the effects of behavioral style, participants were initially grouped according to the scale within the Miller Behavioral Style Survey on which they scored the highest – monitoring or blunting. This method resulted in grossly unequal groups, $N_{monitors} = 200$, $N_{blunters}=36$, $N_{unclassifiable}=58$. Rather than group participants according to this method, then, the scores on the monitoring scale (the more reliable scale, $\alpha = .64$) of the Miller

Behavioral Style Survey was entered into the ANCOVA models as a covariate. This scale was not found to be a significant covariate. Even with controlling for behavioral style no significant differences were found: participants in each group searched similarly to each other regardless of previously-existing preferences for information exposure.

In order to assess the effects of need for evaluation, a median split was used to divide the participants into high- and low need for evaluation groups. A score of 50.00 or greater was considered to be high, while 49.99 or lower was considered low. This division yielded approximately equal groups, N_{high}=157, N_{low}=144). When entered into the ANCOVA model, however, this variable did not produce significant results. The groups did not differ from each other or interact with other variables to produce significant effects.

Participants strongly preferred threatening information, then, in all of the experimental conditions. In order to supplement the results of the non-significant ANCOVAs reported above, an exploratory standard multiple regression was conducted with time spent on threatening websites as the dependent variable. The following predictor variables were included in the model: state anxiety (SA) scores (the mean of the BMIS anxiety scale score and bound anxiety scale score, both administered immediately after the manipulation), trait anxiety (TA) scores, scores on the Need for Evaluation Scale (nEval), scores on the Monitoring Scale (MS) of the Miller Behavioral Style Survey, gender (coded 1 = male, 2 = female), believability of the manipulation (Bel, coded 1=not at all believable, 5 =extremely believable) and message type (Mess, coded 0 = safe, 1 = unsafe).

The regression was statistically significant, R=.29, R^2=.08, adjusted R^2=.06., F(7, 275)=3.46, p=.001. The amount of time spent on threatening websites could be predicted with these independent variables. However, the amount of explained variance was small: roughly 6%. The results of this standard regression are summarized in Table 5.

Table 5

Correlations between Time on Threatening Webpages (Time), State Anxiety (SA), Trait Anxiety (TA), Need for Evaluation (nEval), Behavioral Style (MS), Manipulation Believability (Bel), Gender (Sex), and Message (Mess)

	Time	SA	TA	MS	nEval	Bel	Sex	Mess	*B*	*β*	sr^2
SA	.06								26.75***	.14	.01
TA	-.09	.25**							-22.23	-.09	>.01
MS	-.13*	.17**	.17**						-25.30	-.11	.01
nEval	-.16**	.03	.08	.20***					-9.11*	.13	.01
Bel	.16**	-.13*	-.07	.00	-.03				52.35*	.13	.02
Sex	.02	.32***	.10	.00	-.15**	.00			-31.89	-.04	>.01
Mess	.17	.38***	.04	.04	-.09	-.03	.05		-92.45*	-.13	.01
							Intercept =1397.29***				
Mean	928.03	8.36	6.49	6.37	49.84	3.21	----[a]	----[a]			
SD	371.60	2.00	1.50	1.58	6.11	.93	----[a]	----[a]			

R^2= .08
R^2adj = .06
R = .29*

*p<.05. **p<.01, ***p<.001

[a]Because gender and message were dummy variables, mean and standard deviations were not reported

The t ratios were examined to assess the relative contributions of each of the independent variables. Of the seven predictors, three were significant: state anxiety $t(275)=2.04$, $p=.04$, need for evaluation $t(285)=-2.48$, $p=.01$, and believability $t(275)=2.24$, $p=.03$. For both anxiety and believability, higher ratings predicted more time spent on the threatening websites, while higher scores on the Need for Evaluation Scale predicted less time on threatening websites. The proportions of variance uniquely explained by each of these predictors were very small: $sr^2=.01$ for state anxiety, $sr^2=.01$ for Need for Evaluation, and $sr^2=.02$ for believability.

When this set of independent variables was used to predict time spent on reassuring and filler websites, the model was not significant.

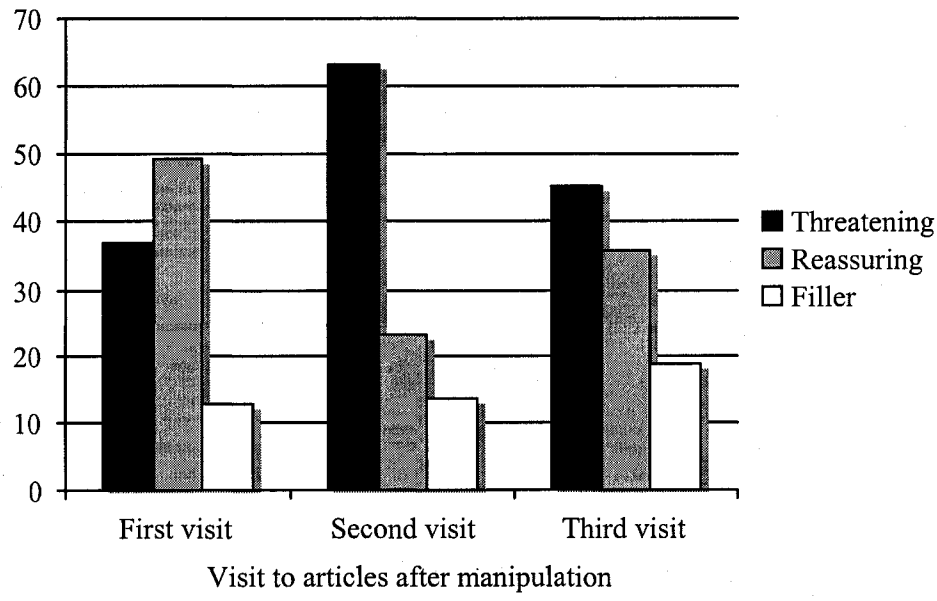
Order of Website Visits

In order to assess the order in which the types of websites were visited, a series of chi square analyses was conducted on the content of the first, second, and third websites visited (not including the main page) by each participant. Although most participants returned to the main page before selecting another website to visit, some participants used the back button on their browser. This action caused their search behavior to appear out of sync with the majority of participants, whose search pattern can be described as follows: visit to website X, return to main page, visit to website Y, return to main page, etc. Cases that did not follow this pattern were eliminated from the chi square analyses.

For their first viewed article, participants were more likely to choose reassuring content, χ^2 ($n=301$, $df=2$)= 64.07, $p<.001$. Forty nine and a half percent of participants selected a reassuring article first, while 36.9% chose a threatening article and 12.6% chose a filler article. The pattern changed for the second and third visits, however: threatening information was more

likely to be selected, χ^2 (n=265, df=2)= 111.31, p<.001 and χ^2 (n=233, df=2)=29.23, p<.001 for the second and third visits, respectively For the second article selected, 63.40% chose a threatening article, 23.02% chose a reassuring article, and 13.58% chose a filler article. For the third article visited, 45.49% chose threatening information, 35.62% chose reassuring information, and 18.88% chose filler information. It should be noted that the arrangement of the articles on the main page might have had an effect on the order of articles selected: all 149 of the participants who selected a reassuring article first selected the same article about the benefits of nuclear power. The link to this article appeared in the upper, left-most corner of the links table, a position that may have created a positive bias for this article immediately upon entering the main site (technical difficulties prevented the website developer from randomizing the position of the article links for each participant). Follow-up analyses revealed no significant differences in the order of content visited by experimental condition. Please see Figure 6.

Figure 6
Order in which participants viewed articles, by content



Recall

Finally, in order to assess differences in information retention across the experimental groups, a 2 x 2 (message x threat) between subjects ANOVA was run using scores on the recall test as the dependent variable. Recall score reflects the number of correct items on a 5-item surprise quiz administered at the end of the experimental session. A main effect was found for message, $F(3,298)=12.20$ $p=.001$, partial $\eta^2=.04$. Participants who read the unsafe message ($M=2.75$, $SD=.97$) had more accurate recall of the information presented in the manipulation article than participants who read the safe message ($M=2.31$, $SD=1.22$).

CHAPTER 4

DISCUSSION

The major purpose of this study was to determine whether anxiety increases or decreases preference for exposure to information about a threat. Prior to this study, most work on this topic was conducted within one of two theoretical frameworks: the affective intelligence framework, which posits that anxiety will increase preference for information, and the terror management framework, which posits that preference for threat information is low under most circumstances. To correct for limitations in the political science and psychology literatures, the design of this study departed from existing studies in several ways: first, anxiety was operationally defined using emotion and arousal measures that are well-established in the psychology literature. Second, anxiety was manipulated in addition to being measured. Third, because the goal of this study is to generalize to search behavior under real threats of terrorism, the manipulation was designed to maximize ecological validity by appearing as similar as possible to a threat that might be encountered in the real world. Fourth, a behavioral measure of preference for information was included. Fifth, individual difference variables that might affect information preference were measured and controlled.

Under these experimental conditions, participants demonstrated a very strong preference for threatening information. Regardless of both the type of message they read about nuclear safety and level of personal threat, participants preferred to read

information that elaborated on the nature of the terrorist threat to nuclear power plants, and the sequence of events that would occur if a plant was successfully attacked. On the surface, then, it appears that the theory of affective intelligence is the more accurate model of information preference. Participants collected information that might be helpful to them in the future, if such an explosion should occur. Compared with the time spent on the threatening web pages, participants practically ignored information that would assure them that risk of terrorism to US plants is low, information that should be more interesting to them if they were managing terror.

However, this finding is complicated by the fact that, while the groups did not differ in their preference for threatening information, they did differ in their anxiety levels. To understand the influence of anxiety on information preference – if there is one – other variables must be considered.

In the pages that follow, the relation between anxiety and selective information exposure will be discussed, followed by a discussion of the other variables that were assessed in this study. The limitations of the findings will then be discussed, followed by the implications of the study and future directions for this line of research.

Anxiety

The present study attempted to manipulate anxiety on two levels: through safety message (i.e., that nuclear power plants are safe, or that they are unsafe), and through personal threat (i.e., the manipulation article focused on the nearby Seabrook plant, or focused on US nuclear power plants in general). While unsafe messages were associated with increases in state anxiety, no effect for threat was found: terrorist threat to the nation in general aroused as much anxiety as a threat specific to the participants' home region.

The failure of the manipulation to produce significantly more anxiety among the participants who read an unsafe message about the nearby plant could be explained two different ways: first, it may be the case that the possibility of terrorists targeting Seabrook Nuclear Power Plant is not believable or realistic, especially, perhaps, among people who live nearby. However, no differences were found between the groups on ratings of the manipulation articles' believability or realism. Second, participants might have been aware of the existence of the Seabrook plant before participating in the study, and therefore interpreted the national threat as a personal threat. This explanation was also ruled out. When previous knowledge of the existence of the Seabrook plant was controlled, the pattern of results did not change.

Although scarce, a few studies have examined the relation between personal and collective threat. Arian and Gordon (1993), studied residents of Tel Aviv during the Gulf War and found that personal interpretations of a threat increased anxiety. Roughly 30% of respondents very strongly agreed with the statement that Saddam Hussein was "out to get them" personally, a belief that was associated with higher ratings of fear than the beliefs that Saddam Hussein was out to get them as "a Jew," as "an Israeli", or "as the Jewish People."

In a separate study, Huddy, Feldman, Capelos, and Provost (2002) found evidence that terrorist threat is comprised of two distinct (but related) dimensions: personal threat and national threat. Personal threat had a small effect on behavior designed to minimize risk of terrorism (such as not flying), but did not influence estimates about the economic consequences of terrorism. Perceived national threat, on the other hand, did influence predictions about the economic impact that another attack would have.

These findings highlight the importance of threat perception as a variable in political psychological research. They demonstrate that the perception of threat can underlie economic beliefs, which in turn can influence attitudes toward relevant policies – an important outcome. Moreover, they demonstrate that social psychological factors, such as identity salience, can influence the perception of a threat. While the present study did not include measures that would shed light on the way the participants interpreted the threatening information posed in the manipulation articles, its failure to find a difference in anxiety levels between personal and national threats are compelling in light of the limited research on the topic. More work is needed to understand the processes underlying the appraisal of a threat as personal or collective, and the emotional and attitudinal consequences of each type of appraisal.

Further understanding of the processes underlying threat interpretation might also shed light on the effect of anxiety on information preference. The present study found only weak evidence for an effect of anxiety on selective exposure. The results of the main hypothesis test revealed no differences between the experimental groups on the amount of time spent on threatening, reassuring, or filler-content websites. An exploratory regression found that state anxiety levels did affect the amount of time spent on the threatening content, but only when a host of other variables were controlled: trait anxiety, behavioral style, need for evaluation, believability, gender, and safety message. When the effects of these variables were removed, participants with higher levels of state anxiety spent more time reading threatening content, although the effect was small. However, it should be noted that this finding is also consistent with the affective intelligence approach.

What can account for the failure of anxiety to strongly influence preference for information in the current study? It could be the case that biases toward negative, threatening, and/or emotional information that operate independently from anxiety were in effect. Kyrios and Iob (1998) found that trait-anxious individuals paid more attention to threatening stimuli, but not significantly more than non-anxious individuals. In fact, both anxious and non-anxious individuals spent more time focusing on threatening stimuli than on neutral stimuli, suggesting a general bias towards threatening information. Media outlets seem to already know this, and frequently feature more negative news stories than positive ones (Berkowitz, 1991; Shoemaker, Chang, & Brendlinger, 1987).

Evidence to support a bias toward emotional stimuli relative to neutral stimuli also abounds. In separate studies, both Zeelenberg, Wagenmakers, & Rotteveel (2006) and Phelps and Anderson (2001) found that subjects were quicker at processing emotion-related stimuli than neutral stimuli. Additionally, Ferré (2003) found enhanced recall for both positive and negative emotion words compared with neutral words. In studies of news consumption, Grabe, Lang, and Zhao (2003) found that "tabloidized" news stories (stories that were reported in a sensational style, designed to heighten emotional reaction) attracted more attention than traditionally reported stories. And Bolls, Lang, and Potter (2001) reported that degree of emotional arousal, rather than emotional valence, was a better predictor of attention to radio advertisements.

The preference for the threatening articles in the current study, then, could be a manifestation of these biases. Participants had a choice between content that aroused negative emotion and neutral content, and chose the arousing content for most of the allotted time. The results of the current study are particularly interesting in light of

previous findings because they replicate the same effects under experimental conditions very different from existing studies. Previous research on attentional biases and anxiety have used reaction-time procedures, such as the Stroop task and dot probe techniques that allow for the clear detection of simple approach-avoidance behavior for anxiety-related stimuli. While these methodologies are important because they illuminate the basic cognitive processes that operate in anxiety, they may fail to capture the complexity of the consequences of anxiety-provoking stimuli in the real world. The replication of these effects within more complex stimuli, then, suggests that these biases may operate in higher-order cognitive tasks as well.

One such process that these biases might affect is information selection. Even in studies that do use more ecologically valid threat stimuli, such as news articles or broadcasts, participants are rarely offered a choice in what they will be watching or reading. Instead, attention and interest are measured through a mixture of self-report and physiological techniques. Thus, the methodology of the current study departs from the existing literature in a second way, through offering participants a choice of information to view. The strong preference for threatening information may indicate that attentional biases toward negative or emotional information are operating in decisions about which information to read. Again, more research is needed to elucidate the effect of anxiety on higher-order cognitive tasks.

Behavioral Style

It appears that more research is also needed to identify individual characteristics that may mediate anxiety's effects on selecting information. The Miller Behavioral Style

Survey was included in the present study because of its ability to predict information seeking and avoidance in other (mostly medical) situations. In the present study, however, scores on the short version of the monitoring and blunting scales of the MBSS did not predict time spent on the threatening, reassuring, or filler websites.

In the short version of the MBSS (Steptoe, 1989), participants read two scenarios, one involving an anxiety-provoking trip to the dentist, and one involving the possibility of losing employment due to declining business. After reading each scenario, participants read a series of statements describing behavior, and marked which behaviors they would be most likely to engage in. Some of the behaviors are characteristic of people who prefer lots of information (monitors), while the others are characteristic of those who prefer to avoid information (blunters). The marks for each type of behavior are added, providing the monitor and blunter scale scores. Examples of behaviors on the monitoring scale include "I would ask the dentist exactly what is going to be done" and "I would talk to other employees to see what my supervisor's evaluation of me said." Examples of blunting behaviors include "I would take a tranquilizer or have a drink before going [to the dentist]" and "I would push all thoughts of being laid off out of my mind."

For the majority of participants, scores on the monitoring scale were higher, a finding consistent with other studies that have used the MBSS. Because the monitoring scale had a higher Cronbach α reliability than the blunting scale, and also because previous research has shown the monitoring scale to have greater predictive power, only that scale was used as a covariate in the analyses of variance on the time spent on each type of website and as an independent variable in the exploratory regression predicting

time spent on the threatening web sites. In both analyses, inclusion of the monitoring variable failed to yield significant results.

It appears, then, that the predictive power of the MBSS does not translate easily from medical situations to socio-political applications. One feature that distinguishes the two settings is the immediacy of the threat: the MBSS was normed on patients about to undergo a painful medical procedure – a threat that is very real, immediate, and definite. In order to detect avoidance of threatening information, anxiety might have to reach or exceed a critical level that, for most people, can only occur under these extreme circumstances. It is important to note here that terror management theorists use very strong anxiety manipulations in order to find avoidance of threatening information. The failure of the MBSS to predict exposure to threatening information might indicate that anxiety levels were not high enough to necessitate distraction from the threat in the present study. In other words, caution should be used when generating the results of the present study to different levels of anxiety – it may be the case that an avoidance effect consistent with the terror management literature would be found when anxiety levels exceed those obtained in the present study.

Another feature that distinguishes medical threats from socio-political threats is the nature of the news. Social norms dictate that information about medical conditions is relatively private, shared only with individuals who are close to the affected person. News about socio-political events, on the other hand, can be used to facilitate social interaction. Following Hurricane Katrina, Procopio and Procopio (2007) found that displaced New Orleans residents used the internet to seek out social contact with members of their geographical community and to share information that lead to

uncertainty reduction. In a time of widespread crisis, knowing a great deal of information about the threat might be socially (and even evolutionarily) beneficial, leading to an implicit attentional bias towards threatening information.

Because of the proliferation of news media over the past few decades, interest in political attitude formation has increased as well. Crucial to understanding this process will bet the identification of variables that underlie preference for information exposure. Although behavioral style was not a successful predictor of information exposure in this study, more work is needed to adapt this useful construct to socio-political contexts.

Recall

Reading an unsafe message about nuclear power plants was associated with more accurate recall of the material presented in the manipulation article. Better recall for these conditions is consistent with the finding that participants preferred threatening information: the emotional nature of these articles may have increased the readers' attention and motivation for comprehension.

This finding is also consistent with the literature on emotion and memory bias. Several studies have shown that non-anxious participants tend to recall negative or threatening information more accurately than neutral information (Reidy & Richards, 1997; Norton, Schaefer, Cox, Dorward, & Wozney, 1988; Kent, 1985).

It is interesting to note that the participants who read the threatening information also had elevated levels of anxiety. According to the vast body of literature on anxiety and memory, small to moderate increases in state anxiety are associated with superior memory recall, while levels of high state anxiety are associated with decreased memory

performance (Eysenck, 1992). Thus, the results of the recall test provide further evidence that the level of anxiety attained by the experimental manipulation was rather moderate and probably insufficient to induce the cognitive deficits documented by the terror management theorists. The goal of the present study, however, was to use an ecologically valid manipulation.

Need for Evaluation

Another individual difference variable to consider in preference for media exposure is need for evaluation. Jarvis and Petty (1996) developed the Need for Evaluation scale to measure individual preferences in assessing positive and negative qualities of an object. It contains items such as "I form opinions about everything", "I want to know exactly what is good and bad about everything", and "I would rather have a strong opinion than no opinion at all." In the present study, participants with high scores on the need for evaluation scale spent significantly less time relative to low need for evaluation participants on the threatening websites when other variables (state and trait anxiety, monitoring scale score, believability, gender, and message) were controlled. A significant relation between need for evaluation scores and time spent on reassuring and filler websites was found only when the latter two variables were added together, suggesting that participants with high need for evaluation divided their remaining time between reassuring and filler websites equally. Participants scoring high on this scale, then, demonstrated a slight bias away from threatening information compared with participants with low need for evaluation, but did not seek reassuring information.

It should be noted that the high need for evaluation participants still favored the threatening information overall. The comparatively smaller amount of time spent on the

threatening web pages relative to low need for evaluation participants could be explained a number of different ways. First, high need for evaluation participants might have decreased their time on the threatening articles because it was unpleasant for them to evaluate the content. Their preference for the threatening content lessened after a certain degree of exposure, perhaps due to increased processing relative to participants with low need for evaluation. This explanation seems somewhat counter-intuitive, however: one would expect people with high need for evaluation to want exposure to multiple sides of an issue before forming a strong opinion.

Then again, maybe not. In their original paper on the construction of the Need for Evaluation Scale, Jarvis and Petty (1996) cite the emerging literature on the automaticity of attitudes as justification for a need for evaluation construct. The finding that people with high need for evaluation spent less time on threat-relevant articles is consistent with the vast body of literature suggesting that opinions and attitudes are largely the result of heuristic-based processing (i.e., Khaneman & Tversky, 1982, Converse, 1964). Need for evaluation was found to correlate only .35 with need for cognition, a moderate correlation which lead Jarvis and Petty to declare that "evaluation by no means requires effortful thought" (Jarvis & Petty, 1996, p.182). Another possible explanation of the present findings, then, could be that high need for evaluation participants appraised the threat information more quickly than low need for evaluation participants and then simply moved on to other available information.

This interpretation seems more plausible than an avoidance effect, given the extensive literature on heuristic processing and attitude formation. The present results are thus consistent with other studies that have found that careful of evaluation of

balanced information does not necessarily follow from having expressed a high need to form opinions.

Limitations

Although one of the major goals of the present study was to observe selective information exposure under real-world conditions, ecological validity was necessarily compromised in a number of ways.

First, the sample was not representative. Instead, a convenience sample of college students was used. A college student sample allowed for easier experimental manipulation: a representative group of local citizens would likely know more about nuclear power and the Seabrook plant, rendering the manipulation articles less believable, and a nationally representative sample would have demanded an experimental manipulation that would be both personally relevant and anxiety-provoking to people across a very large geographic area. Given the literature on the positive bias towards negative stimuli, however, there is little reason to think that adults' preference for threatening information would differ from the students'. However, more research is needed to determine that this is, in fact, the case.

Another limitation of the present study was the restricted nature of the search behavior. Although participants had the freedom to choose which articles they would read and in what order they would read them, they were limited to the threatening, reassuring, and filler articles within the experimental website. There is a possibility that the information that participants wanted most after reading the manipulation article was not included in the website's content. In future studies, including a search function for

nuclear power information or asking participants what questions they have after reading articles about nuclear power could help to ensure that the topics that participants are particularly interested in are included.

Limiting participants to a single website also detracts from the ecological validity of the experiment. In the real world, individuals are likely to check other news sources in order to obtain as much information as possible about a threat. Limiting search behavior to one particular website thus limits the understanding of selective information exposure under threat. Moreover, the 33-minute time period allotted to participants is also an artificial constraint. Although participants had the opportunity to read filler articles unrelated to nuclear terrorism or to simply rest quietly when they were finished reading, these precautions may not have sufficiently prevented meaningless search behavior that could have inflated the observed interest in threatening information.

News source may also affect selective information exposure. Seeing a report of an imminent terrorist threat on a well known, national news site such as CNN.com may influence preference for threat-related material differently than a report on a more local, previously unknown site, such as the one used in this experiment.

Another limitation may be the placement of the links to the articles on the main page. Due to a technical difficulty, the links to the threatening and reassuring articles remained constant for each participant. This arrangement was likely responsible for the preference for the "benefits of nuclear power" as the first article visited by about half of the participants, and may have contributed to preference for certain articles in other ways as well (during preliminary data collection, the main page randomized the location of the article links on each click back to the main page, but did not remain in the same position

for each participant. Participants seemed confused by this and reported that they found the website unconvincing).

Implications

Despite these limitations, however, this experiment still sheds light on preference for threatening information exposure in important ways. The major finding of this study can be summarized as follows: biases towards negative stimuli operating independently of state anxiety enhance both attention to and recall for threatening information. Moreover, limited evidence from other studies suggests that negative socio-political events can serve as a social facilitator, which also may increase motivation for obtaining and comprehending negative news. The preference for negative information appears to be so strong that other information relative to the threat, such as background information about the issue – tends to be ignored. There is greater interest in the consequences of a possible event than in circumstances that contribute to its likelihood of occurring.

The implications of these findings are broad. Within psychology, the present study has replicated the finding that attentional biases toward negative information exist using an experimental paradigm more complicated than the Stroop task and dot-probe technique, answering a call by Izard (1991) to expand the methodology used to assess the relation between emotion and information processing. Although these results do not shed light on the cognitive structure of state or trait anxiety, they do contribute to the existing literature by demonstrating a preference for negative information in an ecologically valid setting.

From a political psychology perspective, this study indicates that the theory of affective intelligence may be the more useful theory of selective information exposure in the socio-political realm. None of the findings of the present study were consistent with terror management theory, which posits that people aim to manage exposure to death-related information under ordinary, non-threatening circumstances. Although terror management theory has been evoked to explain political-psychological phenomena, such as political attitude formation, it seems that a very strong death-salience manipulation is necessary to create an effect. So strong, in fact, that real-world applicability may be precluded.

Furthermore, this study is relevant to the fields of attitude formation and prediction. The information that a person chooses to read about the possibility of a future catastrophic event may increase that person's estimates of the event actually happening, which in turn may affect attitudes toward policies and the politicians who propose them. Understanding the bias towards negative news will allow researchers to develop a more accurate model of political attitude formation.

Within political science, this study offers two pieces of evidence against rational choice theory: first, participants did not seek exposure to balanced information, and second, high need for evaluation participants seemed to be satisfied with smaller amounts of exposure to information. These findings join the ever-expanding literature within political science and political psychology on the surprisingly irrational nature of political behavior.

This study has implications in applied settings as well. News websites concerned with providing the information their visitors want in a clear and efficient manner should

consider putting threat-relevant information at the top of the page or in another clearly visible area. In broadcast news, which operates under a tight time constraints, producers might consider reporting threat-related information first within the reportings of individual stories.

Governments and other organizations interested in dispensing safety information will also find these data useful. Within the past few years, the United States has witnessed several traumatic events made worse by blocked communication: the destruction of New Orleans by Hurricane Katrina and the massacre at Virginia Tech to name just two. In order to communicate critical safety information, organizations will likely find that including threat-relevant information within the context of safety tips will increase readership. For example, in addition to urging citizens to create emergency contact plans, organizations such as the Red Cross might include descriptions of how communication systems can be disrupted. Embedding threat information within the safety information is likely to arouse attention and heighten recall.

Of course, serious consequences arise when people are made unnecessarily anxious, and so the applications of the present study suggested above should be made with extreme discretion. It would be unethical and, if anxiety reaches a certain level, perhaps even ineffective to use scare tactics in order to achieve a certain goal. Studies in health psychology, for example, have shown that arousing high levels of anxiety is more effective at promoting avoidance behavior than self-protective behavior (Janis & Feshbach, 1953). The present study found that interest in threat information was high when reported in the format of objective news article. More research is needed to determine the effects of sensationalized threat information on interest.

Directions for Future Research

Because anxiety did not produce dramatic effects on preference for information exposure about a threatening socio-political event in this study, more research is needed to understand its effects. A good starting point would be the establishment of an external validity criterion for anxiety arousal following exposure to threatening news reports. Knowing, on average, how much anxiety levels increase following exposure to real threats will allow researchers to know when their laboratory manipulations approximate real-world conditions. It would also be useful to obtain lists of questions or types of information desired by people experiencing a threatening report to prevent oversight of relevant pieces of information in selective exposure studies.

Research is also needed to determine how preference for information changes over time. People reading about an attack on a US embassy may immediately want to know who is responsible and whether or not their own safety is jeopardized, but then may desire information about the political motivations for the attack, perhaps followed by a desire for information about what the likely repercussions of the attack will be. Determining if preference for information follows a stage or phase-like pattern and understanding what distinguishes each stage or phase would greatly aid in the understanding of political attitude formation.

Moreover, work is needed to identify issue factors that affect preference for information. For example, while attention is easily piqued by news related to terrorism, it seems that more of an effort is needed to arouse interest in anxiety-provoking environmental issues, such as global warming. One factor that differentiates these issues

is the immediacy of the threat: while a terrorist threat could be imminent, dramatic changes caused by global warming are not likely to occur for many years. Another factor may be the controllability of the event: while there is little that one can do to protect himself or herself from a terrorist attack besides avoid certain places at the right time, global warming coverage tends to focus on the problem's capacity to be solved, perhaps leading individuals to think that governments and scientists have a great deal of control over the issue. Yet another factor to consider is message frame: gain-framed information (such as "protecting yourself against a terror attack" or "steps you can take to fight global warming") will likely affect information preferences differently from loss frames ("how terror will affect the way you travel" or "global warming will cause widespread epidemic").

The personal relevance of the threat is another area that needs further work. It seems intuitive that framing a message in personal terms ("protecting yourself against a terror attack") versus framing a message in national/societal terms ("protecting the nation against a terror attack") would influence the type of questions raised and information desired by the reader. However, the results of the present study indicate that these types of threats do not differ in the amount of anxiety that they raise. Because previous research has identified perceived national threats as relevant to policy attitudes (Huddy, Feldman, Capelos, & Provost, 2002) distinguishing the effects of personal and national threats is an area that should not be ignored.

Finally, more work is needed to determine if there are quantifiable individual differences that affect preference for information exposure. The present study found evidence suggesting that need for evaluation is associated with less time reading the

articles, but the likelihood that other variables also affect preference for information is great. Need for cognition, locus of control, trait anxiety, levels of media consumption, and levels of political knowledge are just some of the variables that should be considered in future studies on individual preferences for political information exposure. More research is also needed to determine the capability of the Miller Behavioral Style Scale to be adapted into the area of political psychology. Quantifying individual preferences for information exposure has been integral to the field of health psychology because of its contribution to the understanding of patients' coping abilities and behavior. The same construct applied to political information would no doubt also be fruitful.

Conclusion

The present study may raise more questions than it answers. However, it offers a partial answer to the questions about political attitudes and behavior under stress that opened this dissertation – namely, that threat elicits a desire for more threat-related information. Individuals and groups interested in predicting attitudes toward relevant policies or candidates under such circumstances will benefit from knowing that people are attracted to negative information that is likely to sustain their state of heightened arousal, and may lead them to over-estimate the probability of the feared event. Immediately following a threat or realized catastrophe, then, candidates who emphasize future risk may receive more attention, and policies aimed at minimizing risk might receive wider support.

The present study also offers some direction for future research. Specifically, it highlights the need to understand the characteristics of threatening information that

makes it so compelling and the consequences of focusing on the threatening aspects of a socio-political issue. Understanding how individuals select information about current events will only increase in importance as information increases in availability, in formats that range from traditional news reports to insider blogs to chat rooms and online fora. The processes that underlie navigation through this information and dictate what material is encoded and applied to attitude formation and change is crucial to understanding and predicting the behavior of citizens, an outcome as important to governing institutions as it is interesting to academics, particularly under times of duress. "The only thing we have to fear is fear itself," said Franklin D. Roosevelt. As fear and its consequences in the political arena are elucidated, perhaps this statement will no longer apply.

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APPENDICES

APPENDIX A

INSTITUTIONAL REVIEW DOCUMENTS

UNIVERSITY of NEW HAMPSHIRE

July 3, 2007

Melissa Surawski
Psychology, Conant Hall
Durham, NH 03824

Study: Anxiety and Selective Information Exposure
Approval Date: 02/13/2007

The Psychology Departmental Review Committee, a subcommittee of the Institutional Review Board (IRB) for the Protection of Human Subjects in Research, reviewed and approved the protocol for your study as Exempt as described in Federal Regulations 45 CFR 46, Subsection 101 (b).

Approval is granted to conduct the project as described in your protocol. Changes in your protocol must be submitted to this committee for review and approval prior to their implementation.

The protection of human subjects in your study is an ongoing process for which you hold primary responsibility. In receiving approval for your protocol, you agree to conduct the project in accordance with the ethical principles and guidelines for the protection of human subjects in research, as described in the Belmont Report. The full text of the Belmont Report is available on the Office of Sponsored Research (OSR) webpage at http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.htm or by request from the OSR.

There is no obligation for you to provide a report to this committee upon project completion unless you experience any unusual or unanticipated results with regard to the participation of human subjects. Please report such events to this office promptly as they occur.

If you have questions or concerns about your project or this approval, please feel free to contact a member of the Psychology Departmental Review Committee.

For the IRB,

Julie F. Simpson
Manager

cc: File

Research Conduct and Compliance Services, Office of Sponsored Research, Service Building, 51 College Road, Durham, NH 03824-3585 * Fax: 603-862-3564

INFORMED CONSENT DOCUMENT

Purpose: The purpose of this research is to understand how people learn information from internet news sources

Description: In this study, you will be asked to read an online news article about a current news issue.. You will be asked some questions about your mood before and after reading the article. After reading the article, you will have some time to explore a website that contains further information. Just as real-life news stories can make you feel uneasy or worried, the article and website may also make you feel uneasy or worried, but not more uncomfortable or anxious than a typical news broadcast. Participation in this study should take about 1.5 hours. If you choose not to participate, you will be given an alternative project to fulfill the course requirement.

PLEASE READ THE FOLLOWING STATEMENTS AND RESPOND AS TO WHETHER OR NOT YOU ARE WILLING TO PARTICIPATE:

1. I understand that the use of human subjects in this project has been approved by the UNH Psychology Department Institutional Review Board for the Protection of Human Subjects.

2. I understand the scope, aims, and purposes of this research project and the procedures to be followed (including identification of any treatments or procedures which are experimental) and the expected duration of my participation.

3. I have received a description of any potential benefits that may be accrued from this research and understand how they may affect me or others.

4. I understand that the confidentiality of all data and records associated with my participation in this research, including my identity, will be fully maintained

5. I understand that my consent to participate in this research is entirely voluntary, and that my refusal to participate will involve no prejudice, penalty, or loss of benefits to which I would otherwise be entitled.

6. I further understand that if I consent to participate, I may discontinue my participation at any time without prejudice, penalty, or loss of benefits to which I would otherwise be entitled.

7. I confirm that no coercion of any kind was used in seeking my participation in this research project.

8. I understand that if I have any questions pertaining to the research, my rights as a research subject, or any research related injury, I have the right to contact the experimenter, Melissa Surawski (Surawski@cisunix.unh.edu) or Julie Simpson in the office of Sponsored Research at 2-3564 and have the opportunity to discuss them in confidence.

9. I understand that I will not be provided financial incentive for my participation by the University of New Hampshire.

10. I understand that any information gained about me as a result of my participation will be provided to me at the conclusion of my involvement in this research project if I request such.

11. I certify that I have read and fully understand the purpose of this research project and its risks and benefits for me as stated above.

I, _____ Consent/Agree to participate in this research project

I, _____ Refuse/Do Not Agree to participate in this research project

_____ _____

signature of participant date

Debriefing Form: Manipulation 1

Thank you for your participation in this study. The purpose of this experiment is to learn more about people's preference for further information after their sense of safety is threatened. You were in the control condition, which means you did not read an article that contained threatening information. Your responses to the surveys and your website-searching behavior will be compared with the responses and behavior of the other participants who did receive a threatening message. We predict that individuals will differ in the amount of information they want and the type of information they want after receiving a message that they may not be safe. It should be noted that nuclear power plants cannot explode like nuclear bombs, and so would not be considered effective terrorist targets. If you have any further questions about the nature of this study or the issue that you read about while participating, please feel free to contact the experimenter, Melissa Surawski, at Surawski@cisunix.unh.edu. Additionally, you may contact Julie Simpson at the Office of Sponsored Research at 2-3564.

Debriefing Form: Manipulation 2

Thank you for your participation in this study. The purpose of this experiment is to learn more about people's preference for further information after their sense of safety is threatened. You were in one of our moderate-anxiety conditions: although you were reading about a nearby power plant, you received a message that nuclear power plants are generally safe. Your responses to the surveys and your website-searching behavior will be compared with the responses and behavior of the other participants who received different types of safety messages. We predict that individuals will differ in the amount of information they want and the type of information they want after receiving a message that they may not be safe. It should be noted that nuclear power plants cannot explode like nuclear bombs, and so would not be considered effective terrorist targets. It should also be noted that Seabrook Nuclear Power Plant has an impeccable safety record. If you have any further questions about the nature of this study or the issue that you read about while you were participating, please feel free to contact the experimenter, Melissa

Surawski, at Surawski@cisunix.unh.edu. Additionally, you may contact Julie Simpson at the Office of Sponsored Research at 2-3564.

Special instructions: Debriefing participants in manipulations 3 and 4 will have an oral component. Participants will be given the following documents to read. They will then be orally presented with the following information:

1. The purpose of this study is to learn more about the way people process information that is scary or threatening to their sense of safety. In order to test our hypotheses, we needed to create articles that would really make you feel anxious. Not all of the information that you read today is true. What you read was an article written by the experimenter.
2. Although we cannot guarantee that nuclear terrorism will never happen, it is very unlikely that terrorists would attack a nuclear power plant.
    a. Nuclear reactors cannot explode like nuclear bombs. They contain an different type of energy.
    b. Even if it did, there are multiple layers of protection that would absorb the fire and radiation
    c. In the unlikely circumstance that radiation did escape into the atmosphere, it would not result in immediate, instant death for millions of people. The effects of radiation are very serious, but not nearly as destructive as this article described. In the only nuclear incident in history in which radiation escaped, only about 60 people died. The cancer rate did increase in the area, but only by 13%.
    d. Seabrook has an absolutely impeccable safety record. Although we do know that plans of US nuclear power plants were found in Afghanistan, there is no evidence that Seabrook was one of those plants, and there has never been a specific threat against the Seabrook plant.
    e. Radiation escaping from Seabrook would actually not travel very far. Terrorists seeking maximum impact would not likely use a nuclear

power plant and are even less likely to use the Seabrook plant. There are plants that are much closer to metropolitan areas.

f. It is really important to the integrity of the experiment that you do not talk about this study with anyone who may participate. Please wait to discuss this study until January.

Debriefing Form: Manipulation 3

Thank you for your participation in this study. The purpose of this experiment is to learn more about people's preference for further information after their sense of safety is threatened. You were in one of our moderate-anxiety conditions: you read about the risks that nuclear power plants pose to their surrounding communities. Your responses to the surveys and your website-searching behavior will be compared with the responses and behavior of the other participants who received different types of safety messages. We predict that individuals will differ in the amount of information they want and the type of information they want after receiving a message that they may not be safe. It should be noted that nuclear power plants cannot explode like bombs, and so would not be considered effective terrorist targets. If you have any further questions about the nature of this study or the issue that you read about while you were participating, please feel free to contact the experimenter, Melissa Surawski, at Surawski@cisunix.unh.edu. Additionally, you may contact Julie Simpson at the Office of Sponsored Research at 2-3564.

Debriefing Form: Manipulation 4

Thank you for your participation in this study. The purpose of this experiment is to learn more about people's preference for further information after their sense of safety is threatened. You were in our high-anxiety condition: you read about the [fictional] safety threats that the Seabrook Nuclear Power Plant poses to its surrounding community. Your response to the surveys and your website searching behavior will be compared with the responses and behavior of the other participants who received different types of safety messages. We predict that individuals will differ in the amount of information they want and the type of information they want after receiving a message that they may not be safe. It should be noted that nuclear power plants absolutely cannot explode like bombs, and so would not be considered effective terrorist targets. It should also be noted that the Seabrook Nuclear Power Plant has an impeccable record of safety.

If you have any further questions about the nature of this study or the issue that you read about while you were participating, please feel free to contact the experimenter, Melissa Surawski, at Surawski@cisunix.unh.edu. Additionally, you may contact Julie Simpson at the Office of Sponsored Research at 2-3564.

APPENDIX B

DEVELOPMENT OF EXPERIMENTAL MANIPULATION

In order to allow the theory of affective intelligence (Marcus, Neuman, & MacKuen, 2000) and terror management theory (Solomon, Greenberg, & Pyszcyznski, 1991, 2003) to be directly compared, the issue to be used in the anxiety manipulation had to meet three criteria: first, it had to arouse sufficient anxiety to affect the behavior of the participants. Second, the issue had to arouse anxiety specifically about the possibility of the participants' own death. Third, because it would have to be convincingly manipulated by the experimenters, the issue could not be one of which college students typically report having a lot of information. Over the course of several brainstorming sessions, a number of possible issues were identified as possible candidates, and were then pretested for the amount of anxiety they might arise, the level of knowledge the participants may have about the issue, and the realism of the issue.

Method

Participants

The participants in the study consisted of volunteers from 2 psychology courses at the University of New Hampshire, a course in Psychology Statistics and a course in child development. In total, 77 students participated in this pretest. Although demographic data were not reliably collected (many students failed to report their gender, age, and year in school on their surveys), the majority of the participants were female, underclassmen, and psychology majors. In exchange for participating in the study, students in the Child

Development course earned course credit, while the data provided by the students in the Statistics course was subsequently analyzed themselves in class demonstrations. Participation was optional for students in both courses, but no students refused to participate.

Procedure

The participants were told that the purpose of the pretest was to identify an issue that arouses anxiety to be used in a dissertation on the effect of anxiety on the search for information. They were told that participation was optional and that if they did not wish to participate, they should simply leave their consent forms and survey packets blank and hand them in with the rest of the students. They were asked to read the instructions carefully, to include their age, gender, and year in college on the back of the survey, and that they could begin when they were ready.

Materials

The survey completed by the participants was designed to test for differences between 5 issues on their ability to arouse anxiety, their realism, and the extent of background information about the issue possessed by college students. The pretested issues included the reinstitution of the draft for male and female US citizens over the age of 18 and regardless of college status, contamination of US food and water supplies with chemical or biological agents by terrorists, increasing chatter detected on terrorist networks which may indicate the planning of an attack, the operation of US ports by companies based in countries affiliated with terrorism, the construction of a bioterrorism laboratory in nearby Boston that would house dangerous toxins such as the ebola virus, smallpox, and anthrax, and the safety of nuclear power plants, including the plant roughly

ten miles from the University of New Hampshire campus. Additionally, the pretest contained two brief scenarios involving the release of stolen toxins from the bioterrorism laboratory in crowded, public places and the meltdown of the Seabrook Nuclear Power Plant caused by terrorists slamming a commercial airplane into the nuclear reactor. Mostly, the participants used 5-point Likert scales to rate the issues, but they were also asked to rank the issues according to how much anxiety they would arouse. When rating the scenarios, the participants were also asked to provide ratings of the probability of the events occurring in real life, the probability that they would die if the scenario did occur in real life, and the probability that people they cared about would die if the scenario occurred in real life.

Results

In order to determine which issue was reported to cause the most anxiety, a one-way ANOVA was run on the anxiety ratings for each of the issues. Overall, the draft and food contamination were found to be significantly higher in anxiety ratings than nuclear power plant safety, the construction of a bioterrorism laboratory, and control of US ports by companies affiliated with terrorism, $F(4,456)=17.05$, $p<.001$. Please see table A-1 for the means.

Table A1
Means and standard deviations of anxiety ratings of pretest issues

Issue	Mean	Std Dev
Reinstution of draft	3.14	0.11
Contamination of food sources	3.09	1.04
Increased terrorist chatter	2.74	0.97
Arab control of US ports	2.36	1.00
Construction of bioterrorism lab	2.13	0.85
Nuclear power plant safety	2.12	0.95

Note. n = 77

Although the draft aroused the most anxiety, it was also the issue that college students reported themselves of having the most knowledge, M=3.43, s=1.13 and was significantly higher than any other issue on this dimension, $F(5,456) = 28.34$, $p<.001$. Thus, it was eliminated from the pool of potential issues to be used in the anxiety manipulation. The students reported knowing significantly less information about the construction of the bioterrorism laboratory than nuclear power plant safety, Arab control of US ports, and contamination of US food and water supplies. Please refer to table A-2 for the means.

Table A2
Means and standard deviations for knowledge ratings of pretest issues

Issue	Mean	Std Dev
Reinstitution of draft	3.43	1.13
Increased terrorist chatter	2.60	1.30
Contamination of food sources	2.47	1.12
Arab control of US ports	2.40	1.40
Nuclear power plant safety	2.30	1.81
Nuclear power plant safety	1.23	0.67

Note. n = 77

Although participants were also asked to rate how much they worried about each of the issues, no significant differences were found.

The low knowledge ratings for the nuclear power plant safety and bioterrorism laboratory construction made them appealing because they could presumably be manipulated in a convincing manner. Although these issues received low anxiety ratings, it may be the case that when more detailed information is presented about them, participants would find them more frightening and anxiety-provoking. This hypothesis was tested by presenting participants with brief scenarios involving widespread disaster caused by terrorist activity involving both issues. After reading each hypothesis, participants were asked to rate how anxiety-provoking, realistic, and frightening they were using a 5-point Likert scale. Only one significant difference was found: the nuclear power plant issue was found to be significantly more anxiety-producing than the bioterrorism laboratory scenario, $F(1,149)=4.33$, $p<.05$. Please see table A-3 for the means.

Table A3

Means and standard deviations for anxiety, realism, and frightening ratings of pretest scenarios

	Anxiety		Realism		Fright	
Issue	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Nuclear	3.89*	1.08	2.68	1.00	3.84	1.14
Biolab	3.53*	1.06	2.57	0.90	3.60	1.05

Note. *significant at $p<.05$

To further assess the level of anxiety and realism that each of the scenarios may induce, participants were also asked to rate, on a 100-point scale, the probability that the

scenario would occur, the likelihood that they would die if the scenario occurred, and the likelihood that someone that they cared about would die if the scenario occurred. Although no significant differences were found between the issues in terms of the likelihood of their occurrence in real life, participants rated the probability that they and someone they cared about would die in the nuclear scenario significantly higher than in the bioterrorism laboratory example, $F(1,142)=17.18$, $p<.001$. Please refer to table A-4 for the means.

Table A4

Means and standard deviations of the probability ratings for scenario occurrence, participants' death in scenario, and death of others in scenario

	Occurrence		Own Death		Others' Death	
Issue	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Nuclear	33.39	22.25	72.60*	28.14	77.58*	28.26
Biolab	31.34	22.44	53.33*	27.61	63.63*	29.38

Note. *significant at $p<.05$

Discussion

It appears, then, that when participants are asked to read about a scenario involving nuclear power plant safety, at least a moderate amount of anxiety is aroused. Furthermore, they perceive the scenario to be somewhat realistic and the possibility of their own death and the deaths of those they care about as very real.

Nuclear power plant safety did rank at the bottom of a list of issues that participants were asked to rate in terms of their ability to arouse anxiety. However, this task required only that participants read the list of issues, which did not contain any further information other than, for example, "nuclear power plant safety (there is a

nuclear power plant roughly 10 miles from the UNH Durham campus)." The most likely explanation for these results is that the participants in the pretest failed to imagine any dangerous situation that may arise from a nuclear power plant in the vicinity, while the other issues they were asked to rate contained more obvious potential for disaster that did not need to be explained to the participants.

The participants' seeming unawareness of the potential danger associated with nuclear power plants in a terrorist situation will allow the issue to be manipulated convincingly. If the idea that terrorists might fly a jet plane into a nearby nuclear reactor had never occurred to them before, the participants may be more likely to feel anxiety. On the other hand, if the participants are familiar with a certain scenario, they may not be readily convinced that the information being presented to them is factual or even believable, and the anxiety manipulation would fail.

Although the results of this present pretest appear somewhat contradictory, they did reveal that the nuclear power plant scenario could arouse anxiety in participants and could also be potentially manipulated in a convincing manner, two conditions necessary for the study being proposed.

APPENDIX C

EXPERIMENTAL MANIPULATION ARTICLES

Condition 1: Safe Message, No Personal Threat

Protests Planned at US Nuclear Plants

Washington, D.C.

Protesters are planning rallies outside several of the nation's nuclear power plant facilities on Saturday. Members of the Citizens Awareness Network (CAN), an grassroots organization trying to end the use of nuclear power, are invoking the risk posed to nuclear facilities by terrorists in order to garner wider support for its cause.

"Nuclear reactors are high-value targets for terrorists determined to inflict large-scale death and destruction" read a statement published on CAN's website.

Since the terrorist attacks on September 11, long-standing concerns about the vulnerability of U.S. nuclear power plants have been resurfaced.

Robert Wallis, chair of the Advisory Committee on Reactor Safeguards at the U.S. Nuclear Regulatory Commission says that the risks posed to nuclear power facilities by terrorists is greatly overstated. "Reactors are extremely well-protected. There is virtually no chance of a terrorist being able to blow up a reactor."

According to the World Association of Nuclear Operators regulation that has been in place since 1966, multiple levels of large physical barriers must be in place to protect reactors. The reactor vessell, which is immediately surrounded by water that will disolve any escaped radiation, is encased in walls that are 3.6 feet thick and made of leaded concrete and lined by steel. Three more concrete walls and a steel shield offer further protection inside the reactor structure. Finally, the entire reactor structure is protected by a dry well well wall made of steel and concrete that is 4.5 feet thick.

Extensive tests have shown that an airplane crashing into the dry well wall cannot penetrate to the reactor. Scientists have calculated the force with which commercial-sized airplanes would hit the outside reactor wall travelling at different speeds and have failed to find any evidence that enough force would be generated to cause even moderate damage. In fact, a test was carried out in which an unmanned plane was flown into a replica of an outside reactor wall. The collision caused a dent that was only 60 milimeters deep.

Furthermore, it is unlikely that terrorists would use an airplane to blow up a nuclear reactor –airplanes heavy enough to have a strong impact have wingspans that are much larger than reactor structures, making it very difficult to hit a target. Further evidence that attacks to nuclear power plants would be ineffective comes from history: during the Cold War, in which the threat of nuclear war escalated, neither the United States or Russia used each other's nuclear power plants as potential targets.

Extensive studies after the only two nuclear accidents in history confirm that widespread disaster would not occur even in the extremely unlikely event that terrorists could penetrate the thick walls that protect the reactor. Studies after the Three Mile Island incident showed that nearly all harmful fission products that escaped from the reactor were dissolved immediately in the water surrounding the vessel. In fact, radioactive material only penetrated a half centimeter of the leaded concrete walls immediately surrounding the reactor. No harmful products escaped even into the outer parts of the reactor structure, let alone the atmosphere, and no one was killed. Studies after the 1986 Chernobyl incident, in which radiation was leaked into the atmosphere, has shown no significant increase in mortality rates or cancer rates due to irradiation in the vicinity of the plant. Furthermore, the radiation levels of the land surrounding the plant have since returned to normal.

"It's not surprising that some people overstate the concern about the terrorist threat to nuclear power plants" said Robert Wallis. "What is surprising is that the government has not made more of an effort to educate its citizens about the reasons why the threat of such an attack is extremely low. To continue to let people believe that they and the Earth are in mortal danger from events that cannot cause significant public harm is to play into the hands of terrorists by making a minor event a cause for life-endagering panic. Now is the time to clear the air and speak a few simple and scientific truths."

Condition 2: Safe Message, Personal Threat

Protests planned at Seabrook Nuclear Power Plant

Seabrook, NH

Protesters are planning rallies outside the nuclear power facility located in Seabrook, NH on Saturday. Members of the Citizens Awareness Network (CAN), an grassroots organization trying to end the use of nuclear power, are invoking the risk posed to the facility by terrorists in order to garner wider support for its cause.

"Nuclear reactors are high-value targets for terrorists determined to inflict large-scale death and destruction" read a statement published on CAN's website.

Since the terrorist attacks on September 11, long-standing concerns about the vulnerability of Seabrook Nulear Power Plant have been resurfaced.

Robert Wallis, chair of the Advisory Committee on Reactor Safeguards at the U.S. Nuclear Regulatory Commission says that the risks posed to the Seabrook plant by terrorists is greatly overstated. "That facility is extremely well-protected. There is virtually no chance of a terrorist being able to blow up the Seabrook reactor."

The Seabrook Nuclear Power Plant was built in accordance with the World Association of Nuclear Operators regulation, which requires that multiple levels of large physical barriers must be in place to protect reactors. The reactor vessell, which is immediately surrounded by water that will disolve any escaped radiation, is encased in walls that are 3.6 feet thick and made of leaded concrete and lined by steel. Three more concrete walls and a steel shield offer further protection inside the reactor structure. Finally, the entire reactor structure is protected by a dry well well wall made of steel and concrete that is 4.5 feet thick.

Extensive tests have shown that an airplane crashing into the dry well wall, such as the one at the Seabrook facility, cannot penetrate to the reactor. Scientists have calculated the force with which commercial-sized airplanes would hit the outside reactor wall travelling at different speeds and have failed to find any evidence that enough force would be generated to cause even moderate damage. In fact, a test was carried out in which an unmanned plane was flown into a replica of the outside reactor wall. The collision caused a dent that was only 60 milimeters deep.

Furthermore, it is unlikely that terrorists would use an airplane to blow up The Seabrook nuclear reactor –airplanes heavy enough to have a strong impact have wingspans that are much larger than reactor structures, making it very difficult to hit it as a target. Further evidence that an attack to a nuclear power plant would be ineffective comes from history: during the Cold War, in which the threat of nuclear war escalated, neither the United States or Russia used each other's nuclear power plants as potential targets.

Extensive studies after the only two nuclear accidents in history confirm that widespread disaster would not occur even in the extremely unlikely event that terrorists could penetrate the thick walls that protect the reactor. Studies after the Three Mile Island incident showed that nearly all harmful fission products that escaped from the reactor were dissolved immediately in the water surrounding the vessel. In fact, radioactive material only penetrated a half centimeter of the leaded concrete walls immediately surrounding the reactor. No harmful products escaped even into the outer parts of the reactor structure, let alone the atmosphere, and no one was killed. Studies after the 1986 Chernobyl incident, in which radiation was leaked into the atmosphere, has shown no significant increase in mortality rates or cancer rates due to irradiation in the vicinity of the plant. Furthermore, the radiation levels of the land surrounding the plant have since returned to normal.

"It's not surprising that some people overstate the concern about the terrorist threat to Seabrook and the nation's other nuclear power plants" says Robert Wallis. "What is surprising is that the government has not made more of an effort to educate its

citizens about the reasons why the threat of such an attack is extremely low. To continue to let people believe that they and the Earth are in mortal danger from events that cannot cause significant public harm is to play into the hands of terrorists by making a minor event a cause for life-endagering panic. Now is the time to clear the air and speak a few simple and scientific truths."

Condition 3: Unsafe Message, No Personal Threat

Report faults security at US Nuclear Power Plants

Washington, DC

Safety issues at the nation's nuclear power facilities are raising concerns after a government watchdog group published a disturbing report following an extensive study.

The Project on Government Oversight (POGO) interviewed security guards at several plants during the summer of 2006 and found that they are under-manned, under-equipped, under-trained, under-paid, and unconfident that they could do anything to stop a terrorist attack.

POGO's findings are particularly disturbing after White House reports that nuclear power plants are attractive targets and vulnerable to terrorists. In his 2002 State of the Union address, President Bush revealed that diagrams of the US nuclear power plants had been found among other materials in Al-Qaeda hideouts in Afghanistan. In April, the White House homeland security budget report identified nuclear power plants as a most-likely terrorist target.

"Because most nuclear plants are close to major cities, I'd say that they're a pretty attractive target [for terrorists]," said Ted LaMont, head of security at the Nuclear Regulatory Commission. "Add to that the fact that many of the plants are right on the coast, which means radiation can drift quite easily. You can see why the terrorists would want to hit the nuclear plants. They could conceivably kill millions of people in a single attack."

Although Congress recommended that security at nuclear power plants should be tightened following the terrorist attacks on September 11, 2001, the POGO report found very little progress in enhancing security measures.

Through interviews with security guards at several plants, POGO found that, on average, only 5 guards are on duty to protect a facility at a time. Although armed, the guards typically carry rifles – no match for the automatic weapons that terrorists would likely use in an attack. Additionally, they receive very little training on their weapons; while the Nuclear Regulatory Commission (NRC) recommends 90 hours of weapons training per year, the average number of hours reported by the guards was less than 3.

"When I was in the army, I was trained on the same rifle that we use here," said a guard who has asked not to be identified. "The plant recently downgraded the scopes and now I don't know how to use them. I have no confidence that I would be able to hit a stationary target from 20 feet away. Forget about a moving target. No way."

The POGO report also noted that under current NRC regulations, guards are not allowed to shoot at a target that does not appear to be carrying a gun. If a terrorist is running towards a reactor with a backpack full of explosives, the only legal course of action for the guard to take would be to call the local police.

The NRC commented that the role of the guards is merely to delay an attack, not to stop it outright. However, POGO has pointed out some problems with this security plan as well. During routine testing of the security teams at eleven plants, mock terrorists were able to get by the guards and reach the reactor controls in less than 3 minutes, even though the security teams were given advance notice of the test and detailed plans of the mock attacks. Within another 5 minutes, a highly trained and suicidal terrorist team would be able to cause a core-reactor meltdown, causing massive destruction.

According to the very same mock-terrorism test, it took local police, on average, nearly an hour to assemble the SWAT team, arrive at the scene, be briefed on the situation and location of the intruders inside the building, familiarize themselves with the layout of the plant, coordinate their communication equipment, and devise and execute a plan to stop them.

"It's ludicrous that guards are dependent on local authorities to help them stop a terrorist attack," commented Paul Levesque, research professor of nuclear physics at Stanford University in Palo Alto, California. "Considering that a nuclear power plant houses more than a thousand times the radiation as released in an atomic bomb, a single attack at a nuclear plant could instantly incinerate more than 100,000 people. Even right here, in my office, about 10 miles from a plant, I would be instantly incinerated. Stanford would become one giant, burnt-out tomb. The destruction would stretch from the coasts of to the mountains to the cities further south along the coast, and that land would remain barren and toxic for decades, if not longer."

"The police and everyone else would be dead before they even knew what happened," commented a guard who took part in one of the mock-terrorism exercises and asked not to be identified.

The POGO report asked the guards how they felt about their responsibility for keeping millions of people safe from a terrorist attack. "I think it's a sham. People should know that they're not giving us adequate weapons, that they don't let us shoot, that they don't train us. I honestly think that if a van pulled up and 20 terrorist jumped out, the guards would run for their lives," said an unidentified guard.

On average, the guards at nuclear power plants earn $3 an hour less than the custodians in the same plant. The annual turnover rate is 86%.

Pinkerton Security, a security firm used by 70% of the nation's nuclear power plants, declined to comment on the POGO report. The NRC, when reached for comment, stated that they were in the planning stages of their own investigation into the report.

Condition 4: Unsafe Message, Personal Threat

Report faults security at Seabrook Plant

Seabrook, NH

Safety issues at the Seabrook Nuclear Power Facility are raising concerns after a government watchdog group published a disturbing report following an extensive study.

The Project on Government Oversight (POGO) interviewed security guards at the Seabrook plant during the summer of 2006 and found that they are under-manned, under-equipped, under-trained, under-paid, and unconfident that they could do anything to stop a terrorist attack.

POGO's findings are particularly disturbing after White House reports that Seabrook is an attractive target and vulnerable to terrorists. In his 2002 State of the Union address, President Bush revealed that diagrams of the Seabrook plant had been found among other materials related to nuclear power in Al-Qaeda hideouts in Afghanistan. In April, the White House homeland security budget report identified the Seabrook facility as one of the highest-risk plants, given its location roughly 30 miles from the Boston metropolitan area.

"Because of our proximity to Boston, I'd say that we're a pretty attractive target [for terrorists]," said Ted LaMont, head of security at the Seabrook Nuclear Power Plant. "Add to that the fact that we're right on the coast and radiation can drift quite easily into the New York area, and you see why the terrorists would want to hit us. They could conceivably kill millions of people in a single attack."

Although Congress recommended that security at nuclear power plants should be tightened following the terrorist attacks on September 11, 2001, the POGO report found very little progress in enhancing security measures at Seabrook.

Typically, only 5 guards are on duty at a time. Although armed, the guards carry rifles – no match for the automatic weapons that terrorists would likely use in an attack. Additionally, they receive very little training on their weapons; while the Nuclear Regulatory Commission (NRC) recommends 90 hours of weapons training per year for each security guard, the Seabrook guards reported getting less than 3.

"When I was in the army, I was trained on the same rifle that we use at Seabrook," said a guard who has asked not to be identified. "The plant recently

downgraded the scopes and now I don't know how to use them. I have no confidence that I would be able to hit a stationary target from 20 feet away. Forget about a moving target. No way."

The POGO report also noted that under current NRC regulations, guards are not allowed to shoot at a target that does not appear to be carrying a gun. If a terrorist is running towards a reactor with a backpack full of explosives, the only legal course of action for the guard to take would be to call the local police.

The NRC commented that the role of the guards at the Seabrook facility is merely to delay an attack, not to stop it outright. However, POGO has pointed out some problems with this security plan as well. In a routine testing of the security team at Seabrook, mock terrorists were able to get by the guards and reach the reactor controls in less than 3 minutes, even though security team was given advance notice of the test and detailed plans of the mock attack. Within another 5 minutes, a highly trained and suicidal terrorist team would be able to cause a core-reactor meltdown, causing massive destruction.

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"It's ludicrous that guards are dependent on local authorities to help them stop a terrorist attack," commented Paul Levesque, research professor of nuclear physics at the nearby University of New Hampshire. "Considering that a nuclear power plant houses more than a thousand times the radiation as released in an atomic bomb, a single attack at Seabrook could instantly incinerate more than 100,000 people. Even right here, in my office, a few miles from the plant, I would be instantly incinerated. UNH would become one giant, burnt-out tomb. The destruction would stretch from the coasts of Maine to the mountains of Vermont to the cities further south along the coast, and that land would remain barren and toxic for decades, if not longer."

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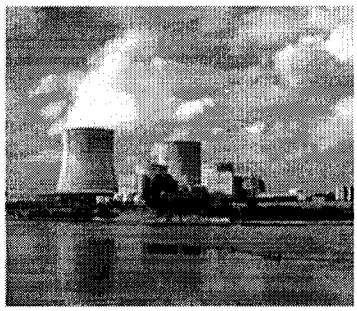
The guards at Seabrook make $3 an hour less than the custodians in the same plant. The annual turnover rate is 86%.

Pinkerton Security, the security firm used by the Seabrook facility, declined to comment on the POGO report. The NRC, when reached for comment, stated that they were in the planning stages of their own investigation into the report.

APPENDIX D

EXPERIMENTAL WEBSITE

NHNEWS.COM



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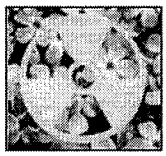
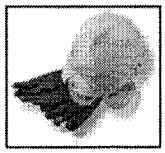
***NHNews* takes a special in-depth look at the issues surrounding this controversial source of energy.**



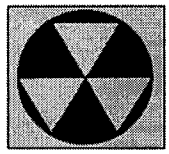
Benefits of Nuclear Power

The Threat of Nuclear Terrorism

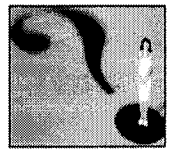
How We Protect Our Nuclear Plants



History of Safety: Plant Records

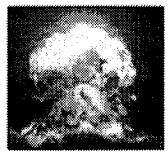


How to Survive a Nuclear Explosion



Editorial: Are Terrorists Targeting Nuclear Plants?

Victims' Voices: Chernobyl



What Happens in a Nuclear Explosion?

APPENDIX E

MEASURES

Brief Mood Introspection Scale

INSTRUCTIONS: Choose the response on the scale that indicates how well each adjective or phrase describes your PRESENT MOOD STATE.

XX = Definitely DO NOT feel
X = DO NOT feel
V = Slightly feel
VV = Definitely feel

1. Lively
    a. (1) Definitely DO NOT feel
    b. (2) DO NOT feel
    c. (3) Slightly feel
    d. (4) Definitely feel
2. Happy
    a. Etc.
3. Sad
4. Tired
5. Caring
6. Content
7. Gloomy
8. Jittery
9. Drowsy
10. Grouchy
11. Peppy
12. Nervous
13. Calm
14. Loving
15. Fed-up
16. Active

Overall, my mood is:
Very unpleasant Very Pleasant
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Bound Anxiety Measure

Instructions: Choose the response on the scale that indicates how well each phrase describes how you feel right now:

XX = Definitely NO NOT feel
X = DO NOT feel
V = Slightly feel
VV = Definitely feel

1. Anxious about terrorism or other catastrophic events
2. Satisfied with the precautions the government is taking to keep our homeland safe
3. Afraid of events that I cannot control
4. Scared that my family, friends, and I are not really safe
5. Upset about the damage to our environment
6. Pleased with nuclear power as a clean, sustainable, and safe energy source
7. Worried that it is only a matter of time before another terrorist attack occurs
8. Relieved about the progress that has been made in fighting Al-Qaeda

Need for Evaluation Scale

1 extremely **un**characteristic
2 somewhat **un**characteristic
3 uncertain
4 somewhat characteristic
5 extremely characteristic

1. I form opinions about everything
2. I prefer to avoid taking extreme positions
3. It is very important for me to hold strong opinions
4. I want to know exactly what is good and bad about everything
5. I often prefer to remain neutral about complex issues
6. If something does not affect me, I do not usually determine if it is good or bad
7. I enjoy strongly liking and disliking new things
8. There are many things for which I do not have a preference
9. It bothers me to remain neutral
10. I like to have strong opinions even when I am not personally involved
11. I have many more opinions than the average person
12. I would rather have a strong opinion than no opinion at all
13. I pay a lot of attention to whether things are good or bad
14. I only form strong opinions if I have to
15. I like to decide that new things are really good or bad
16. I am pretty much indifferent to many important issues

Brief Mood Introspection Scale - Trait

Now, we are going to ask you about your moods in general. We want to know what kinds of mood you feel most often.

INSTRUCTIONS: Choose the response on the scale that indicates how well each adjective or phrase describes how you usually feel

1 = I never feel this way on a regular basis
2 = I rarely feel this way on a regular basis
3 = Sometimes I feel this way on a regular basis
4 = I frequently feel this way on a regular basis

17. Lively
    a. (1) I never feel this way on a regular basis
    b. (2) I rarely feel this way on a regular basis
    c. (3) Sometimes I feel this way on a regular basis
    d. (4) I frequently feel this way on a regular basis
18. Happy
    a. Etc.
19. Sad
20. Tired
21. Caring
22. Content
23. Gloomy
24. Jittery
25. Drowsy
26. Grouchy
27. Peppy
28. Nervous
29. Calm
30. Loving
31. Fed-up
32. Active

On a regular basis, my mood is usually:

Very unpleasant . Very Pleasant

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Brief Big Five Personality Measure

Here are a number of personality traits that may or may not apply to you. Please chose a number for each statement to indicate the extent to which you agree or disagree that the statement describes you. You should rate the extent to which the *pair* of traits applies to you, even if one characteristic applies more strongly than the other.

strongly disagree	moderately disagree	neither agree nor disagree	moderately agree	strongly agree
1	2	3	4	5

I myself as:

1. _____ Extraverted, enthusiastic
2. _____ Critical, quarrelsome
3. _____ Dependable, self-disciplined
4. _____ Anxious, easily upset
5. _____ Open to new experiences, complex
6. _____ Reserved, quiet
7. _____ Sympathetic, warm
8. _____ Disorganized, careless
9. _____ Calm, emotionally stable
10. _____ Conventional, uncreative

Miller Behavioral Style Scale

Permission not granted to reprint.

Demographic Questionnaire

Some further questions about you

1. Demographics
    a. 1. What is your gender?
        i. Male
        ii. Female
        iii. Transgendered
    b. 2. How old are you?
    c. 3. What best describes your year in college?
        i. Freshman
        ii. Sophomore
        iii. Junior
        iv. Senior
        v. Graduate

vi. Other (including non-degree)

d. 4. What term best describes you?
   i. Caucasian (white)
   ii. African-American
   iii. Asian-American
   iv. Native American
   v. Other
e. 5. Are you of Hispanic descent?
   i. Yes
   ii. No
f. 6. Have you lived the majority of your life in the United States?
   i. Yes
   ii. No
g. 7. If not, how long ago did you move to the United States?
   i. Years _____
   ii. Months ____
h. 8. Is English your first language?
   i. Yes
   ii. No
i. 9. Which of the following statements best describes where your permanent (home) address is?
   i. Southern New Hampshire
   ii. Central New Hampshire
   iii. Northern New Hampshire
   iv. Massachusetts
   v. Rhode Island
   vi. Connecticut
   vii. Vermont
   viii. Another State outside of New England
   ix. Another country
j. 10. Do other family members (such as parents and siblings) live at that address?
   i. Yes
   ii. No

2. Manipulation check
   a. 11. Before today, did you know that there is a nuclear power plant in Seabrook, New Hampshire?
      i. Yes
      ii. No
   b. 12. Do you know anyone who works at the Seabrook Nuclear Facility?
      i. Yes
      ii. No
   c. 13. Have you ever been to the Seabrook Nuclear Facility?
      i. Yes
      ii. No

d. 14. Before today, how much would you say you knew about nuclear power?
    i. Very little
    ii. A little
    iii. A fair amount
    iv. A lot
    v. Enough to be considered an expert
e. 15. Before today, how concerned were you about the safety of nuclear power plants?
    i. Not concerned at all
    ii. A little concerned
    iii. Moderately concerned
    iv. Very concerned
    v. Extremely concerned
f. 16. After reading the articles in this study, how concerned are you about the safety of nuclear power plants?
    i. Not concerned at all
    ii. A little concerned
    iii. Moderately concerned
    iv. Very concerned
    v. Extremely concerned
g. 17. Do you think an accident is likely to occur at Seabrook Nuclear Power Plant?
    i. Not at all likely
    ii. Somewhat likely
    iii. Moderately likely
    iv. Very likely
    v. Extremely likely
h. 18. Do you think a terrorist attack is likely to occur at Seabrook Nuclear Power Plant?
    i. Not at all likely
    ii. Somewhat likely
    iii. Moderately likely
    iv. Very likely
    v. Extremely likely
i. 19. Generally, how believable was the information on the website that you read today for this study?
    i. Not at all believable
    ii. Somewhat believable
    iii. Moderately believable
    iv. Very believable
    v. Extremely believable
j. 20. Generally, how realistic was the website that you read today for the study?
    i. Not at all realistic
    ii. Somewhat realistic

iii. Moderately realistic
iv. Very realistic
v. Extremely realistic

3. Media Consumption
   a. 21. Generally, how much time do you spend a day watching television news? ____minutes
   b. 22. How much time do you spend a day reading about the news on internet websites? ____ minutes
   c. 23. How much time do you spend listening to the news on the radio? ____minutes
   d. 24. When you are reading, listening to, or watching the news, what section do you pay the most attention to?
      i. Local news
      ii. US news
      iii. International news
      iv. Sports
      v. Entertainment news
      vi. Politics
      vii. Health and Science
      viii. Business
      ix. Travel
      x. Education
      xi. Other
   e. 25. What information source do you rely on most to learn about current events?
      i. Television
      ii. Internet
      iii. Radio
      iv. Talking to friends and family
      v. College or University classes
      vi. Other source
4. Political demographics
   a. 26. Have you ever voted?
      i. Yes
      ii. No
   b. 27. If you have voted, have you ever voted for a Democratic candidate?
      i. Yes
      ii. No
   c. 28. If you have voted, have you ever voted for a Republican candidate?
      i. Yes
      ii. No
   d. 29. If you have voted, have you ever voted for an independent candidate?
      i. Yes
      ii. No
   e. 30. If you have voted, have you ever voted for a Green Party candidate?
      i. Yes

ii. No

f. 31. Which political party do you tend to agree with more?
   i. Democratic Party
   ii. Republican Party
   iii. Neither
   iv. I don't know

g. 32. Which of the following terms best characterizes your political beliefs?
   i. Very liberal
   ii. Liberal
   iii. Middle of the road
   iv. Conservative
   v. Very conservative
   vi. I don't know

h. 33. Insert party affiliation measure here –waiting for scales

5. Do you have any thoughts about this study that you think the experimenters would find useful? Please share them with us here!: